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The Jackson Lecture.[1]

EXPERIENCES IN PREVENTIVE MEDICINE.[1]

By A. JEFFERIS TURNER, M.D. (London), D.P.H. (Cambridge),
Brisbane.

WHEN I was asked to deliver this lecture I hesitated long. I am not capable of lecturing on medical history, ancient or modern. The most I can give you are reminiscences, recollections and reflections strung on the slender string indicated by my title. Since I have been persuaded to do this, I hope you will not be too much disappointed.

[1] Delivered at a meeting of the Queensland Branch of the British Medical Association on August 5, 1938.

Let me first pay a brief tribute to Dr. E. S. Jackson, in whose honour these lectures have been instituted. Dr. Jackson and I have been contemporaries. We did not always see things alike; indeed, we had our differences, and even our controversies, in the dim and distant past. In these I always found him a formidable opponent. Since then, though we may differ in some of our opinions, I have learnt to respect his ideals, and to admire his personal charm and force. Opinions may be important, or they may not, but ideals and character are the salt that saves us from corruption.

When I wrote these words I was hoping that Dr. Jackson would read the report of this lecture. That he will not do so added to the poignancy of the news that he had passed from among us.

I landed in Australia in 1888. This date is fixed in my memory because this was the Centenary Year, and I remember visiting the Centennial Exhibition

in Melbourne. After a few months spent in Sydney, I arrived in Brisbane in July, 1889, to be the first resident medical officer at the Children's Hospital. I held this position for three years, not including an interval of several months in which I was the senior resident medical officer at the Hobart Hospital. I had had a good medical education, as it was considered at that time, at the University College Hospital in London. I learnt most from Gowers in medicine and from Marcus Beck in surgery. The former is well known as a great pioneer in neurology; the latter was one of the very few Listerian surgeons in London.

Sometimes the best things one learns are what one discovers for oneself. In our medical library I picked up a small volume published by the New Sydenham Society. It was a translation of Koch's early researches on anthrax, mouse septicæmia and other bacterial diseases. From this beginning I came into contact with the work of Pasteur and Lister, and a new world opened before me. Once Lister came to our hospital and gave us a lecture on the bacteria of milk. This was before Koch had introduced cultures on solid media. To obtain pure cultures from milk Lister first estimated the number of organisms per cubic centimetre with a hæmocytometer. He then diluted the milk until each drop contained on an average one bacterium, and with these inoculated tubes containing sterile milk. Some remained sterile, some contained two or more species of bacteria, many contained pure cultures of the most varied organisms. It was a fascinating lecture.

The Children's Hospital in Brisbane was a large, two-storeyed wooden building, ill-planned and inconvenient. There I learnt that the very best work could be done in a very inferior building. I do not undervalue the convenience of a well-built hospital. It may enable the staff to do better work, though not necessarily so. It should enable them to do more work in less time, with less fatigue. It should make nursing easier. It ought to be, but I fear it is not always, more comfortable for the patient, whose chief needs are plenty of air and plenty of light. After all, a hospital building, as Dr. McLelland has said recently, is a dead thing—just as our city organ would be a dead thing without an organist. The usefulness of a hospital depends mainly on its medical and nursing staff. If the medical staff is not of the highest quality, if the nursing staff is not chosen for its capabilities, but on the recommendation of politicians, then that hospital, however palatial its building and however perfect its equipment, will do inferior work.

I was fortunate in the honorary staff: Joseph Hill, Lockhart Gibson, David Hardie, Wilton Love. When Dr. Hill, who was, I believe, mainly instrumental in bringing me to Brisbane, resigned, he was succeeded by Peter Bancroft. We were a very united staff, all of about the same age; and they treated me more as a colleague than as a resident medical officer. Of all these, only two, my good friends Sir David Hardie and Dr. Lockhart Gibson, are still with us. The hospital was managed by a ladies' committee, which proved most efficient. Practising real economy, they provided everything needful, but never ran into debt. With medical matters they never interfered. I attended their meetings, and my advice on such matters was always taken. On major matters, such as the election of new honorary medical officers, the advice of the medical staff was always accepted. During the thirty years that I remained on the staff I cannot remember any instance in which there was any serious difficulty in our relations. I wish I could say as much of other hospital boards and committees in this State.

I was very keen on studying clinical medicine at first hand under hospital conditions, and I felt the urge to record my observations. From 1890, for twenty years, I made numerous contributions to the medical journals. I shall not say anything about these ephemeral writings. The autumn leaves of thirty years ago have long since decayed, the winter snows have melted, the spring rains have been absorbed by the unheeding earth.

At that time, and for many years later, I took no interest in preventive medicine, but was wholly absorbed in problems of diagnosis and treatment. A small annexe to the hospital was utilized for diphtheria patients. There I had my most responsible work. I soon learnt that internal medicines and local applications were of no appreciable value, though I gave them a long trial. Tracheotomy was frequently needed. I delayed operation until increasing sternal recession or signs of commencing exhaustion made it imperative. I had to operate single-handed at any hour of the day or night, more often the latter. I saved about one patient in three, which at that time was a good average. But the mortality rate of about 70%, mostly among children aged from two to five years, was ghastly. Medical men of today cannot realize it.

In 1894 I revisited England and took up a course in bacteriology. In a German text-book I read of Behring's discovery of antitoxin, then fully worked out, but only in guinea-pigs. My friends in England thought little of it; but my mind was made up. Somehow I managed to obtain an introduction to Behring. He received me most kindly and invited me to work in his laboratory by the side of his two assistants, one of whom was an Englishman. There I spent some happy months and regretted that I could not accept his invitation to continue. On my return to Brisbane diphtheria antitoxin was just being released for clinicians, and I was fully prepared to use it. It is quite unnecessary to give the results obtained. Behring was one of the greatest benefactors of the human race. He removed the greatest terror of childhood. My brother in America sent me a very fine portrait of him, which I presented to the new diphtheria block at the Children's Hospital. I do not know whether it still hangs there. At that time I had only one

anxiety—that diphtheria should as far as possible be recognized early and treated promptly. The necessity for immunization, which has been so much facilitated by Ramon's great discovery of anatoxin, was not realized till long after.

In 1892 two children from Cairns were admitted to the hospital suffering from grave anæmia. It happened that an article on anæmia caused by ancylostoma had recently appeared in *The British Medical Journal*. Guided by this, I had no difficulty in finding the characteristic ova. This was a noteworthy discovery. Other cases were recognized as they appeared, and the infection was found to extend on the coast, mostly on sugar farms, as far south as the Tweed. It was some years before we learnt how to expel the worms, and many years later that the penetration of the skin by ancylostoma larvæ was demonstrated by Loos in Egypt. This explained why the disease affected whole families, and why so many patients returned to hospital reinfected. In an effort at prevention we distributed leaflets to parents; but this was not enough. We knew how the disease spread and how to prevent it from spreading; and action on a large scale was an urgent necessity. I wrote in *The Australian Medical Gazette* in 1909:

> We hear a good deal at the present time about filling the north of Australia with a white population. How far this policy will prove a success depends mostly on the health of the second and succeeding generations of these immigrants. When our statesmen have a little time to spare for the things that really matter, I should like them to pay some attention to the reports of the United States Commission on the ravages of parasitic anæmia.

Our statesmen did nothing, until in 1917 the Rockefeller Foundation sent out a team to teach us how to do the job. By that time I had learnt something about the obstacles in the way of preventive medicine.

In the transactions of the Australasian Medical Congress held in Sydney in 1892, there appeared a detailed account of lead poisoning in Queensland children. I shall not discuss the clinical details. There is no need "to fight this battle o'er again, and thrice to slay the slain".

The one weak point in this account was that we could not give the source of the poison; and this I shall discuss. But first I must refer to another paper, which appeared in the same transactions. A child had been admitted into our hospital with optic neuritis and paralysis of the sixth nerve. I diagnosed a cerebral tumour; but the child made a complete recovery. When three further patients with the same disorder had been observed to recover, my first diagnosis was obviously incorrect. I seemed to have met with a new disease: something wrong at the base of the brain, perhaps a localized meningitis. A few such cases were observed every year. In one or two, other ocular paralyses and acute cerebral symptoms supervened. Most resembled the first cases observed; but in some of them the optic neuritis, or rather papillœdema, was followed by atrophy and blindness. I was much puzzled, until Dr. Lockhart Gibson, in 1897, solved the riddle by proving, to my satisfaction, that these were cases of lead encephalopathy. In 1908, and again in 1912, he demonstrated that blindness might be prevented by early and, if necessary, repeated lowering of the pressure of the cerebro-spinal fluid by puncture. This, I consider, was a remarkably fine piece of clinical research.

Two possible sources of widespread plumbism were suggested: lead dissolved in tank water used for drinking (this was disproved by analysis) and lead paint. Neither explained why the poisoning was restricted to children and in many, perhaps most, instances to only one child in the family, although all lived in wooden houses painted inside and out. In 1904 Dr. Gibson gave us the key to this riddle. He showed us that paint inside the house, once it is dry, is harmless; and that outside weathering of painted veranda rails, fences and gates was the danger. Most illuminating was the remark of one of the mothers, whom he was questioning: "And this is the only one of my children who bites his nails." Children under five years of age, from want of proper training, put their fingers in their mouths. Those over that age suffering from plumbism were found in almost every instance to be nail-biters. The key fitted well. As soon as one had diagnosed plumbism, one inquired where the child played. One then rubbed one's hand over the railing, fence or gate, and found it covered with white dust. If necessary, a sample was kept for analysis. If the child was kept away from the poison he recovered. If he was not kept away he did not recover. If after having been kept away in hospital for sufficient time to recover, he went back to the same conditions, he relapsed.

Before we could secure any preventive measures we had to convince the medical profession in Brisbane, and that took many years. To produce any impression on the Government took still longer. At last, in 1923, a regulation was enforced prohibiting the use of lead paint in schools, on veranda rails, and on outside surfaces within the reach of children. This was good. Later still, excellent regulations were passed prohibiting the use of poisonous paint on all outside surfaces within the reach of children's fingers. We thought the battle was won; but we were mistaken. Queensland has developed a masterpiece of political strategy: to proclaim excellent regulations, and so conciliate those who were asking for them; and then, by not enforcing these regulations, to conciliate those who thought it was to their interest not to observe them.

We were not surprised that the painting trade did not easily take to new methods. But we were both surprised and hurt at the long-continued scepticism of our profession in the southern States. They appeared unable to realize that our housing conditions were different from theirs. We learnt also that there were large commercial interests involved in the use of lead paint. In 1922 a medical expert declared that no harm could result from the ingestion by children of powdered lead paint from rails and fences, and proceeded to ridicule Dr. Gibson's "sup-

posed" discovery of optic neuritis caused by lead. The controversy had once more to be reopened. After that, one inquiry after another was made to ascertain whether there was any truth in our contentions. In each instance they were finally admitted to be correct, and at last the inquiries ceased.

Lead poisoning has become comparatively rare among Queensland children, not so much as the result of Government action as owing to the education of the public and the discovery by the painting trade that non-poisonous paints on surfaces exposed to weathering are just as good as those they previously used, or even better.

The great plague occurred in the year 1900. Queensland was ill prepared for such an emergency. There was an advisory board of health with no administrative authority. Its meetings were open to the Press, and often furnished material for newspaper paragraphs, humorous or otherwise. Inevitably the epidemic caused panic and confusion. Outside the Brisbane area this became so bad that I was appointed temporary health officer for central and northern Queensland. I took my small laboratory outfit to Townsville, but after the first week or two it was of little use to me. I had no assistant, and the area over which I had to travel extended from Gladstone to Cairns. For diagnosis I had to depend on clinical observation and gland puncture. Most of my work centred in Rockhampton and Townsville. In the former area I found the local authority and hospital willing to cooperate, and things went well. At Townsville the local authority was non-cooperative, and the advice I gave them led to no action.

Plague is a deadly disease. There are few others which end in death so rapidly and inevitably. I met with cases of this sort. But mild infections of bubonic plague also occur. In Townsville the initial severe cases were followed by a series of mild cases; and from an administrative point of view these were more difficult to deal with. Diagnosis would have been much helped by isolation in a suspect ward, as in other towns. The medical autocrat of the local hospital, who was in deadly feud with all others of his own profession, refused, in spite of my conciliatory approaches, to give me any assistance. The plague hospital was six miles out of town, and but for me it would have been placed much further out. In those days there were no motor cars. The town was in a very insanitary condition. The stenches in the main street were worse than any I had encountered since I visited the Chinese city of Shanghai. Every vacant allotment was covered with rubbish, affording splendid cover for rats. There was no provision for the collection of kitchen refuse, and rat food was easily obtainable. On the town common I counted eighteen rotting horse carcasses. This, I told them, was not the way to sweeten their sea breezes. Milder remonstrances having failed, it was my duty to be outspoken. My statements were published in *The Townsville Bulletin*, and the mayor was furious. A rumour was circulated that I was paid a lump sum for every case notified. A public meeting was called, at which I was accused of insulting the living and desecrating the dead. One speaker declared that I ought to be horsewhipped in the street. Fortunately I was not actually assaulted, and not long afterwards the epidemic had run its course. I had had a strenuous six months.

After this I once more revisited England and studied for the diploma in public health. The course of study at Guy's Hospital medical school was interesting, and the fact that I had to sit for examination at Cambridge on my fortieth birthday had its humorous aspect.

The weakest point in our hospital system is the out-patient department. Many hours of valuable time are wasted, and many needless gallons of medicine are swallowed by those whose real needs are better nutrition, better home conditions, and better education in the needs of health. On my journey to England in 1917 I spent some days in Indianapolis, no mean city, in the middle west of the United States of America. There I was much impressed by the outdoor service of their teaching hospital. A complete card index was kept of all discharged patients, with whom contact was maintained by a voluntary visiting staff, many of whom were undergraduates (mostly medical students). Home conditions were carefully studied, each patient's individual needs were noted, and necessary treatment was not allowed to be interrupted by patients' carelessness or inability to attend the hospital at specified times. Hospitals in Queensland have neither visiting nurses nor volunteers. Our Children's Hospital had a small out-patient department, and we endeavoured to make it serve some good purpose, in spite of the unfavourable conditions that prevailed in this country. Particularly were we troubled by the bottle-fed infants that were brought to us in their first year. I well remember spending much time in advising their mothers verbally and in writing; but I fear little good was effected. Babies died in large numbers of innutrition, usually accompanied by loose motions. In addition, and especially in the annual epidemic which commenced every November, large numbers of poorly nourished infants, and with them many who had appeared healthy, were carried off by acute diarrhœal attacks. Our hospital committee became deeply concerned, and at last built a beautifully equipped babies' ward, where, in spite of our best care, the mortality reached somewhere near 50%. Acutely ill babies mostly died rapidly. Chronically ill babies did not progress well. They seemed to become "hospitalized", lying like logs in their cots, and were frequently carried off by relapses, which appeared to be caused by cross-infection. It seemed clear that by treating the sickest babies (for we had not room for all) we were tackling the problem at the wrong end. What was most needed was prevention, not desperate attempts to cure.

When I started private practice this baby problem obsessed me. Only then did I realize my own

ignorance. I sought guidance from all the latest books. Among them was one that came from New Zealand, on the feeding and care of the infant. This taught me much, though I could not agree with all it contained. I procured accurate scales and weighed every baby at every opportunity. I tried many methods of feeding and made appalling mistakes. I gained knowledge slowly, but it was based on hard experience. After a few years I began to inquire into causation. Why were these babies artificially fed? I found that in almost every case they had been weaned for no good reason. Indeed, there is no good reason for early weaning except one, and that is that the mother's health makes it necessary. This is sound knowledge, but is of no use when one's advice is sought several months too late. To restore the health of the babies brought to me required in many cases a hard battle, lasting many weeks or even months, and ending sometimes in defeat. The pity of it!

Clinical medicine deals with individuals separately. Preventive medicine deals also with individuals, but massed. Perhaps you will allow me to take a few figures from an old writing of mine (*The Australian Medical Gazette*, 1910). The mean mortality rate during the first year of life in Queensland for the ten years from 1899 to 1908 was 90 per thousand. The highest for any one year was 119·9, in 1903; the lowest, 70·3, in 1908. In 1936 the mortality rate was 36·2. In 1908 the mortality rate in Brisbane (which was a smaller area than that of the present city) was 70·8; in 1936 it was 37·8. I classified the Brisbane death certificates for 1908 and now compare them with those of Queensland in 1936. I have divided them into five classes and have calculated the percentages of each on the total deaths.

TABLE I.

Causes of Infantile Deaths.	Percentage in Brisbane in 1908.	Percentage in Queensland in 1936.
Antenatal causes	35·8	72·6
Diarrhœal causes	42·7	4·3
Respiratory diseases	7·7	11·0
Zymotic diseases (so-called)	4·7	2·9
All other causes	9·8	9·6

Diarrhœal diseases, which in 1908 caused nearly one-half of the total deaths, now cause less than 5%. Antenatal causes, which then took the second place, are now responsible for nearly three-quarters of these deaths. Actually the mortality from antenatal causes, when calculated on the number of births, has fallen slightly. I shall trouble you with no more figures.

I know of no subject on which there have been more confused thinking and more complacent ignorance than that of infantile diarrhœa. All sorts of causes were assumed to be responsible, and it was generally assumed that a high mortality was inevitable. One brilliant theorist declared that this mortality varied with and was caused by the higher or lower level of subsoil water. Actually, of course, diarrhœa is caused by irritant material in the bowel, which sets up increased peristalsis. Nature's method of cure is beneficial no doubt in intention, but is often clumsy and ineffectual. These loose motions are due either to undigested and fermenting food material or to the invasion of the bowel by infecting bacteria of many species, among which dysentery bacilli play a prominent part. Of late years confused thinkers have been much comforted by the assumption that all infants with loose motions are suffering from gastro-enteritis, a fine-sounding word, which conveys no knowledge but conceals much ignorance. Now that this cause of death has been reduced to very low proportion, we can see clearly that this result has been obtained, first, by the general return to breast feeding, secondly, by much greater knowledge of artificial feeding, and thirdly, by much greater care in the prevention of the contamination of infants' food, either by unclean handling or by fly-borne bacteria.

About the year 1916 there was much concern in the Australian States regarding our high infantile mortality rate as compared with that of New Zealand, especially the mortality from diarrhœal conditions. In all the States there were movements for the prevention of this waste of infant life, usually promoted by women's organizations, sometimes aided by local authorities or State health departments. In New South Wales the State took a more prominent part, and Queensland followed this example. In 1917 infant welfare centres, locally known as baby clinics, were first opened in Brisbane, and during the next few years in our larger towns. Unfortunately the medical profession did not initiate this movement, nor do I think that, for the most part, it was much interested. Originated as it was by politicians and without medical direction, there was a great risk of its early failure. By great good fortune this was averted by the wise selection as director of a remarkably able woman, Miss Chatfield, then superintendent of the Diamantina Hospital.

There are two ways in which the State can assist infant welfare: first, by providing the necessary funds, and secondly, by erecting suitable buildings. The buildings given us in Queensland have been all that could be wished for, though in some instances their sites have been badly chosen. These two things are not the most important factor, which is a well-trained and competent nursing service. Of this Miss Chatfield was well aware; and her first demand, which was granted, was to be allowed to visit Sydney and inquire into the training and work there. Having made herself fully acquainted with the work being done at the baby clinics in that city and in the training school at the Tresillian Hospital, she was able to make her plans for Queensland. The first step was to send our nurses for training to the Tresillian Hospital, and this naturally took some time, as they had to be sent by detachments. The second step was to establish a training school in Brisbane, the success or failure

of which would depend on the nurse selected as teacher. For this post Miss Chatfield selected an ex-War sister, Miss Barron, who had shown great aptitude for teaching, and sent her to the Karitane Hospital at Dunedin. Miss Barron fully justified her selection, and has proved a most efficient teacher and thoroughly devoted to her work, both in teaching and management. Miss Chatfield and Miss Barron successfuly accomplished the difficult work of providing a child welfare nursing service of high quality, second to none in any part of the world. Our training centre was opened in 1924.

When I returned to Brisbane in 1918 there were four baby clinics in this city. They were gaining their experience under difficult conditions. Good nurses had been selected, but they had had no special training in the work they had to do, and the medical profession was then, for the most part, indifferent. At that time I used to make two long afternoon visits to the Diamantina Hospital every week, and often discussed infant welfare with Miss Chatfield over a cup of tea. In short, I gradually became an honorary medical adviser. In 1922 or thereabouts I became honorary medical officer to the Valley clinic, and in 1926 I was appointed director of infant welfare by the Honourable James Stopford.

I had been elected president of the Pædiatric Section of the Australasian Medical Congress held in Dunedin in February, 1927. Hearing of this, Mr. Stopford commissioned me to tour New Zealand from Dunedin to Auckland, to acquire all the information I could of the infant welfare work of that Dominion. I had an interesting and profitable time. The subject I had selected for my presidential address was the artificial feeding of infants. It was perhaps a bold step to attack this subject in the stronghold of Sir Truby King; but it was then too late to make any change, and I have always thought that courage is usually the best policy. Among other material I brought forward the evidence furnished by a long series of careful analyses, carried out by Dr. Wardlaw and Dr. Dart, of Sydney, of milk from a large number of mothers suckling healthy babies. These showed that the theoretical basis of the percentage feeding insisted on in New Zealand had no real existence. The percentages of proteins and fat in these milks were extremely variable, the average of fat content being not 3·5%, as is usually assumed, but nearly 5%. Only in the percentage of sugar was Nature careful to keep within a narrow limit of 6% to 7%. Sir Truby King's reception of these analyses was characteristic. He refused to believe them. He could not believe that Nature was so careless. He pointed out that unless the breasts were fully emptied, the estimation of the fat percentage was fallacious. This is true; but at the moment of speaking he forgot that this error, if it existed, would make the percentage too low, not too high. In my reply I was careful to avoid giving offence by scoring debating points, and invited Sir Truby to close the discussion, a compliment which, I think, he appreciated.

In this way I succeeded both in expressing my own opinions and in enlisting Sir Truby's friendly interest, which I needed for my investigations. I had to walk warily; for when on a later occasion I asked him what he thought was the main cause of the great reduction in infant mortality in New Zealand, and asked whether it was breast feeding, I saw he was not pleased. He answered shortly: "It is the whole Plunket system." After that I asked him no more questions. From the excellent nurses I afterwards interviewed I learnt all I wanted. One of them replied to a question about her methods of artificial feeding, that she had very little experience of it, as nearly all the babies she saw were wholly or partly breast fed. The inference I drew was that the exact system of artificial feeding adopted was not a great factor in the reduction of the mortality rate. I also ascertained that the most scrupulous care was taken by these nurses to adapt the diet to the infant by starting with low percentages, working gradually upwards, and not persisting in trying to attain the prescribed fat percentage for infants who were intolerant of fat. Used with these precautions, the diet schemes gave good results. When I reached Wellington, Sir Truby King invited me to his club, and after lunch took me to a quiet corner of the library and lectured me for three-quarters of an hour, to convert me to the true faith of the whole Plunket system. When at last there came a pause, I replied that, while not committing myself to every detail, I fully recognized the great work he had done in New Zealand.

This was sincerely said. Sir Truby had done much to improve the health and save the lives of the babies of half the world. I was amazed at the authority that he had established over the women of New Zealand. Even his weaknesses seemed to have been of service to him in this. I would have given much to have attained even a small fraction of his great driving power. I admired his devotion to a great and worthy object, his dogged persistence in the face of strong opposition, his insight into the great principles of infant welfare at a time when these were much neglected, his keen perception of good mothercraft, and his fervent love of the infant. If I have candidly indicated some points in which I think he was deficient, it has been in no carping spirit. I have little sympathy with those who deny the existence of spots in the sun, but still less with those who can see nothing in the sun but its spots. His name will live as one of the pioneers of infant welfare, long after his minor peculiarities have been forgotten.

I must pass rapidly over the years that followed, and deal with only a few of the most important incidents. One of my first efforts was to improve the education of maternity nurses in the management of the new-born, and especially in the induction of breast feeding. I found that many medical men—there were some brilliant exceptions—were leaving the management of the baby to the nurses,

who often knew no more about it than themselves. Infants were leaving private hospitals, bottle fed, with diminished prospects of survival and often with impaired health. In fact, some of our maternity nurses were among our worst baby slaughterers. This indictment may sound brutal; but it is true. For this the blame rested not so much with the nurses, who knew no better, but with those who had trained them. I approached the Nurses' Board and urged that all the trainees should be taught the correct management of the infant for the first three weeks after birth. In accomplishing this I met with some difficulty; but I had at that time the sympathetic support of the Home Department, and I was successful. No immediate benefit could be expected, for it was impossible, though I attempted it, to train the nurses who were already practising. But during the years that have followed, the results of this improved training have become more and more evident.

After the opening of the clinics at Charters Towers and Warwick the development of our service had to proceed on new lines. There were no more openings for stationary nurses working in full-time clinics. No longer could we remain static; we had to become a travelling service. Our first attempt in this direction was the infant welfare railway car, which rendered invaluable service in spreading the knowledge of child welfare among an apathetic population; but an annual visit is of little use to mothers who are in difficulties with their own babies. They need branch clinics, visited weekly if possible, but if not, fortnightly, and in some instances kept open two days a week. Our first move was to establish five branches in the Cairns district, and these were opened in 1930. These branches were most successful; but the financial depression came suddenly and stopped all further extensions. This I expected; and even a second year of waiting had to be endured. But when a third and fourth year passed, and other States were expanding their child welfare work, and our own State was spending large sums in other directions, I seriously considered whether I could not do more for this work by resigning my official position. All my urgent and persevering efforts had failed, and even a personal appeal to the Premier had no immediate result; but it was not forgotten, and a year later, in 1934, I was permitted to open all the branches I had asked for. Progress has continued, and we have now 88 branches in addition to 16 full-time clinics. The chief difficulties in their establishment have been our scanty and scattered population and the railway time-tables. We have not yet exhausted this mode of extension, but shall do so before long. We shall have to adopt other methods to achieve our object, which is to bring child welfare, as far as possible, to every mother in the State. This cannot be done by annual visits. With the opening of so many branches on the railway lines there is much less benefit in the present work of the railway car, and I think it might be put to a better use. Our infant welfare department is still a young and growing service, and we have plans for the future.

These four years were not altogether wasted. We were denied opportunities for extension, and therefore concentrated on intensive progress. Frequently it has been pointed out that there is a serious gap between infant welfare services and school medical services. The simplest method of filling this gap was to extend our definition of infancy to include all children beneath school age. During the interval between the ages of two years and six years is laid a great part of the foundation of the mental and physical soundness of the developing child. It is a period of the utmost importance. We could not meet all the needs of this period. Kindergartens, nursery schools and playgrounds are, then, of the greatest value, and almost an assential for the development of character. For this work our nurses are not trained, and it must be left to other agencies. But the physical development of the young child is certainly within our province. The problems here are very much the same as those of infancy. During my journeys throughout the State I had become acquainted with the alarming number of children suffering from poor nutrition, and destined to become poorly developed adults with poor resistance to disease. We do not know the proportion of our children so affected, and shall not, until a nutritional survey has been made of our child population; but I should not expect it to be much less than 20% in most areas, and in some higher. In this connexion the valuable report of Dr. Clements ("The Fourth Report of the Advisory Council on Nutrition"), on his nutritional survey of the children of western Queensland, deserves careful perusal. The want of education in Queensland as to the foods necessary for good nutrition is the greatest cause of ill health. Its effects are especially prominent among young children and expectant and nursing mothers. To qualify our nurses to give necessary advice, a special development of our training was needed. They had to be made familiar with the values of all common foods, including vitamin and mineral contents. For some time this new teaching absorbed much of my energy. All this was undertaken some years before our medical practitioners took much interest in nutrition. Now that they have awakened rather suddenly to its importance it is not necessary for me to enter into details.

Another matter in which the nurses had to be trained was the prevention of respiratory infections. These now take a heavier toll of infant life than do bowel infections; yet scarcely any attempt is made to lessen their prevalence. Nurses are well trained in the management of sick children; but until they come to us they have received scarcely any training in preventing these infections. They have to be made familiar with the exact mechanism by which disease germs are spread from person to person, in order that they may have an intelligent understanding of the methods of prevention. They have to be taught the menace of carriers, the dangers

of the common cold, which is not caused by cold, the dangers of crowded rooms and halls, and of poor ventilation, the prevalence of bad habits which convey infection, and many other points. As the absolute prevention of infection is impossible, emphasis has to be laid on the dangers of massive infection and the possibility of building up resistance, which is nearly always relative, not absolute. Nurses can be taught these things; to teach them to our people will be a slow process. It may take one or two generations to produce much effect. We propose to begin now.

When the baby clinics were started the medical profession was not consulted, nor were they informed of their methods and objects. Naturally the profession viewed them with distrust and suspicion for a long time. I believe some doctors looked on them as competitors in medical practice. On the contrary, they are designed to help all medical men in the management of a difficult branch of their practice. Child welfare needs the help of the nursing profession just as much as do hospitals and private practice. Competition between these two professions should be unthinkable. I may say that I have never had any difficulty with the British Medical Association. Some of our best practitioners have been sympathetic from the beginning; and I am glad to say that many practitioners are now making use of clinic services.

Nor was any serious attempt made to enlist the cooperation of women's associations. In other States the first steps to improve the health of mothers and children were taken by these associations, which still hold an important place in their management. In Queensland the Government pays the whole cost and controls the service without any outside assistance. This has some advantages. We are spared the worry and trouble of raising funds by appealing to private generosity. There is still ample scope for benevolence in the support of crêche and kindergarten work, children's playgrounds, cripples, seaside homes and seaside holidays for children from the far west. On the other hand, we have suffered from the want of that interest which women naturally feel for the work, for which they have made sacrifices. We have been spared the worry and extra work entailed by a number of committees; but I am not sure that bureaucratic control is not a worse evil. However, this system having been established, it seems impossible to alter it, and we must make the best use of it we can.

From the beginning I have endeavoured to enlist the support of women's associations for our work, in particular the Country Women's Association and the Mothercraft Association, and from these we have received much help. Most of our country branches are housed in the rooms of the Country Women's Association. This has had great advantages. These rooms are clean, bright, the accustomed resort of mothers, and always in the most convenient situation. They have allowed us the use of these rooms, sometimes to the inconvenience of some of their members, free of cost. I welcome this, not as a money matter, but because experience shows that men and women take more interest in work for which they have made some sacrifice. I fear some Government officials do not rightly appreciate this. I am informed that in two hospitals that are being built provision is being made for rooms for baby clinics. I hope we may not be deprived of the great advantages we derive from the present location of most of our branches. This would lead to a serious diminution in the attendances, partly because most of these hospitals are not conveniently situated, partly because mothers think, and to my mind rightly, that hospitals are places for the sick, not for healthy infants. The danger from infections, to which young infants are extremely susceptible, would be very real. It would come chiefly from visitors to the hospital, who must sometimes be carriers of infection, from chronic cases, and from convalescents; it would be encountered in trams and buses as well as in waiting rooms. It is impossible to prevent entirely the possibility of infection anywhere, but it is our duty to reduce the exposure of infants to this danger to a minimum. "And whosoever shall offend one of these little ones that believe in me, it is better for him . . ."—I need not complete the quotation.

The efficiency of all child welfare work depends on the careful selection of the nursing staff. The possession of a child welfare certificate is not sufficent evidence of fitness. It is desirable that these certificates should be held by as many nurses as possible, for the training they have received increases their efficiency in all work which deals with mothers and children. More than fifty nurses obtain these certificates every year; but as our whole staff consists of nine nurses, it is evident that only a few of them can be selected each year for our baby clinics. These should be the best suited for this special work. The percentage (60) of marks required for a pass in the examination is not that of an honours examination. To pass the examination requires a fair knowledge only. Of the minority who obtain high marks, not all are suitable for baby clinic work, and some of those who make only a moderate success of their examination are well adapted for it. We know this, because all our trainees take part in the work of the clinics, both indoor and visiting, under the supervision of our senior nurses. A suitable nurse must not only have knowledge; she must be able to impart this knowledge to the mothers and to secure their good will. This is largely a matter of personality. Nurses require also to be capable of arduous work, including long and sometimes tiring journeys, and should therefore be healthy, vigorous, and not too advanced in age. All these facts need to be appreciated by those who exercise political control. With few exceptions the nurses at present on our staff are of the right type and admirably fitted for their work. Nothing will more certainly lower our standards than the selection of candidates for personal reasons or on the recommendation of members of Parliament, who cannot know their

capabilities. The appointment of an unsuitable nurse does the service an injury, which increases every year as she advances in seniority. It is harmful to all mothers and children in her district. Such appointments have been rare in the past; but I much regret that they are becoming more common. It would be difficult to object to the minister's expressing a wish that the claims of a candidate should be carefully considered; but to have unsuitable nurses forced on us by any official does irrevocable harm. We are expected to do good work; and the excellence of our work depends on the personality of our staff. I am not questioning the motives of our politicians, but their knowledge. I am quite sure they desire our work to be successful. Its success depends on the avoidance of the appointment of unsuitable nurses. Failing this, to a superficial observer our work might seem to be proceeding on the same lines as before; but in reality it would be white-anted. To replace workers with the necessary capabilities and enthusiasm by those who are less suitable would hamstring our best efforts. I earnestly entreat all politicians and those in authority to save us from this great danger.

I must conclude. I have given you reminiscences and reflections as I promised. I fear they have been too long and have wearied you. My only excuse is that I have left out more than I have put in. Looking back over the last fifty years, I seem to have had a varied life and accomplished little; but the best of that little has, I think, been accomplished in the last twelve years.

THE ARRANGEMENT OF THE DEEP CERVICAL FASCIA.

By E. S. MEYERS, M.B. (Sydney), F.R.A.C.S.,
Senior Honorary Surgeon, Brisbane Hospital; Lecturer in Anatomy, University of Queensland;

AND

R. K. MACPHERSON, M.Sc. (Queensland),
Senior Demonstrator, Department of Biology, University of Queensland.

TILLAUX[4] has remarked on the Proteus-like nature of the deep fascia of the neck, and another Frenchman, Sebilau (quoted by Testut) has observed with typical Gallic insight, that, in defining its layers, the wish is father to the plane and the scalpel is directed accordingly. Some have gone so far as to say that the planes described as existing in this fascia are artifacts pure and simple, and that no such structures occur during life. But, as apology for yet another account of the arrangements of the fascia of the neck, we would state that the facts to be recorded here are largely the result of observations on the living. Observations have been made in the dissecting room, *post mortem* room and operating theatre; but it is in the last-named place that the reader may most profitably verify the description for himself.

It is maintained that the general principles governing the arrangement of the fascia in this region in no wise differ from those which determine its arrangement in any other part of the body. It is our opinion that sufficient attention has not been given to these general principles, because on them depend the understanding of the fascial arrangement in the neck and, as a corollary, the understanding also of the various surgical affections encountered in practice.

Among the more important principles we would include the following:

1. Most skeletal muscles are surrounded by fascia. The exceptions are those lying upon bone, cartilage *et cetera*. Here the covering is found only on one side. This is an obvious but important consideration.
2. The strength and arrangement of this investing fascia varies tremendously. Sometimes it forms a strong closed investment known as a sheath; at other times there is merely a thin enveloping layer.
3. Where muscles are in contiguity or, as in the neck, where they overlie one another, the fascial layer separating two muscles is common to these two muscles. In the living this is a fact of paramount importance and has been lost sight of in descriptions based upon studies of the dead.
4. Fascia should be regarded as a living structure with the capacity of a living structure to respond to stimuli in its own particular way.

In this study no attempt will be made to describe the fascia in the posterior compartment of the neck. The description will be confined to the conditions found in the anterior compartment.

The hyoid bone forms a convenient landmark in the description of the fascial arrangements, because below it the muscles follow a fairly simple arrangement, whilst above it numerous complications are introduced in the arrangement. It is clear, then, that the disposition of the fascia above and below this level will differ. Therefore, for purposes of convenience it is best to describe the arrangement in two distinct parts: first, that found below the level of the hyoid bone, and secondly, that found above that level.

The terminology used varies in many respects from that found in the standard text-books; but the excuse is offered that the terminologies in use vary as much as the descriptions, and the one put forward here, we trust, has at least the merit of being easily understood.

The Arrangement Below the Level of the Hyoid Bone.

In so far as the anterior compartment of the neck is concerned, we have to consider the following muscles: (i) the sterno-mastoid; (ii) the sterno-hyoid and the omo-hyoid, which two are considered as being in the one plane; (iii) the sterno-thyreoid; (iv) the muscles of the pharynx, which have fascia on one side only; (v) the prevertebral muscles, which have fascia on the anterior surface only.

If we apply our general principles of fascial arrangement with respect to these muscles we shall have progressed a long way towards our goal. The

layers of fascia vary much in their degree of development; some are strong, others weak. The relative strength is probably determined by the function of the invested muscle. However, it must be remembered that, while it is relatively easy to pull fascia apart in the process of dissection, nevertheless the fascial sheaths are able to withstand the various stresses met with in the living condition.

Let us consider now the fascial arrangements at a typical level, for example, that shown in Figure I. This illustrates diagrammatically a transverse section of the anterior compartment of the neck at the level of the sixth cervical vertebra.

If we examine the arrangement of the muscles and fascia a little to one side of the mid-line, as we pass backwards we find the following structures in the order given: (i) the investing layer of the fascia; (ii) the fascia over the sterno-hyoid muscle; (iii) the sterno-hyoid muscle; (iv) the fascia in common with the sterno-hyoid and sterno-thyreoid muscles; (v) the sterno-thyreoid muscle; (vi) the fascia deep to the sterno-thyreoid muscle; (vii) the constrictor muscle; (viii) the fascia over the constrictor muscle; (ix) the prevertebral fascia; (x) the prevertebral muscles.

Now we have only to trace each layer of the fascia mentioned, in a lateral direction, to see the way in which it joins with the other layers, when the whole arrangement will become clear and it will be seen to be in accordance with the principles outlined above.

In regard to the outermost or investing layer little need be said. It passes laterally from the mid-line anteriorly, where it is continuous with a similar layer on the opposite side; it invests the sterno-mastoid, roofs over the posterior triangle, encloses the trapezius and is attached to the *ligamentum nuchæ* in the mid-line posteriorly. In short, everyone is agreed on the existence and disposition of this layer.

The second layer is one of great importance—a fact which, in our opinion, has not been sufficiently stressed by the majority of observers. It is derived from the fascial sheaths of the sterno-hyoid and omo-hyoid muscles, which are considered as being in the same morphological plane. Beginning at the mid-line, it passes laterally, investing in turn the sterno-hyoid and the omo-hyoid, and passing further laterally comes into relation with the internal jugular vein, turning round the lateral aspect of this vessel to become continuous with the prevertebral layer of fascia.

The next layer to be considered is that coming off laterally from the sterno-thyreoid muscle. This layer is also of great importance but of much greater strength than the preceding one. At the lateral border of the sterno-thyreoid muscle the fascial sheaths covering its anterior and posterior surfaces fuse to form the third layer of the deep fascia. This layer passes postero-laterally to join the retrovisceral layer, which lies on the posterior surface of the constrictor muscle. In its course it passes between the great vessels and the thyreoid gland, and provides a sheath for the latter. Passing as it does medial to the carotid artery, it contributes to the formation of the carotid sheath, constituting its medial wall. It also gives off, just anterior to the artery, a thin layer of fascia, which passes between the carotid artery and the internal jugular vein, forming a partition between these two vessels.

Consideration of Figure I shows how all the layers enumerated above have become continuous. In addition, the mode of formation of the following structures is indicated:

The Carotid Sheath.—An investing layer of the great vessels of the neck, the so-called carotid sheath, may be considered as consisting of three components: (*a*) one from the fascia over the sterno-hyoid and omo-hyoid muscles, (*b*) one from the fascia over the sterno-thyreoid muscle, and (*c*) one from the prevertebral fascia.

The Sheath for the Thyreoid Gland.—A sheath for the thyreoid gland is formed by the fascia coming off from both surfaces of the sterno-thyreoid muscle.

The Retropharyngeal Space.—A retropharyngeal space is formed anteriorly by the retrovisceral fascia, posteriorly by the prevertebral fascia, and laterally by the medial portion of the carotid sheath.

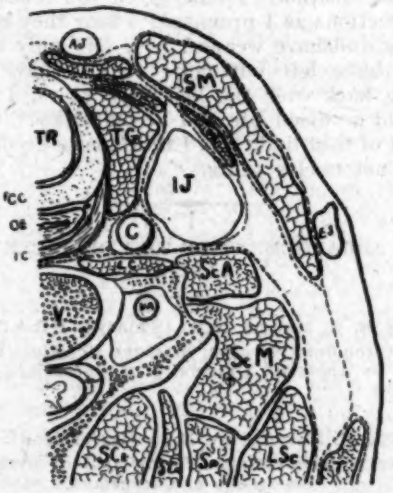

FIGURE I.

Schematic transverse section of the anterior part of the left half of the neck at the level of the sixth cervical vertebra, to show the arrangement of the fascia at that level. (*C* = common carotid, *IJ* = internal jugular, *LC* = *longus cervicis*, *LSc* = *levator scapulæ*, *OE* = œsophagus, *OH* = omo-hyoid, *ScA* = *scalenus anterior*, *SCo* = *semispinalis capitis*, *ScM* = *scalenus medius*, *SCe* = *semispinalis cervicis*, *SH* = sterno-hyoid, *SM* = sterno-mastoid, *Sp* = splenius, *ST* = sterno-thyreoid, *T* = trapezius, *TG* = thyreoid gland, *Tr* = trachea, *V* = sixth cervical vertebra, *VA* = vertebral artery.) The fascial planes are indicated by broken lines.

If a section is taken at a higher level, say just below the upper border of the thyreoid cartilage, as shown in Figure II, similar conditions are found to prevail. It is to be noted, however, that: (i) the thyreoid gland has disappeared from the section; (ii) the thyreo-hyoid muscle replaces the sterno-thyreoid muscle; (iii) the retrovisceral layer may

now be described as the aponeurosis of the inferior constrictor of the pharynx.

If we examine a preparation from which the sterno-mastoid muscle has been removed, we can observe the whole extent of the fascial layer covering the sterno-hyoid and omo-hyoid muscles. At the level at which the omo-hyoid crosses the internal jugular vein it is obvious that the arrangement described above for this layer can no longer hold good, as the fascia is drawn outwards by the omo-hyoid muscle.

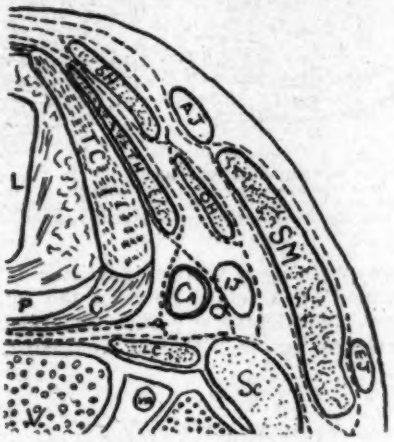

FIGURE II.

Schematic transverse section at the level of the upper part of the thyreoid cartilage. (*AJ* = anterior jugular, *C* = inferior constrictor, *CA* = carotid artery, *EJ* = external jugular, *IJ* = internal jugular, *L* = cavity of the larynx, *LC* = *longus cervicis*, *OH* = omo-hyoid, *SM* = sterno-mastoid, *TC* = thyreoid cartilage, *TH* = thyreo-hyoid, *V* = body of fifth cervical vertebra, *VA* = vertebral artery.)

There remains now to be considered the attachment of these layers at the root of the neck. The attachment of the investing layer is exactly as described in the standard text-books; it encloses the space of Burns above the sternum and the supra-clavicular space as it passes laterally and gains attachment to the clavicle. The attachment of the sterno-omo-hyoid layer is along the upper border of the sternum and clavicle, merging with the attachment of the inner lamella of the investing layer. The layer on the anterior surface of the sterno-thyreoid (which is common to it and the sterno-hyoid) will, of course, gain an attachment to the sternum. The layer of fascia on the deep surface of the sterno-thyreoid passes down into the thorax to blend with the fibrous pericardium over the great vessels in the superior mediastinum in front of the trachea.

We would call attention here to the caudal extent of the retropharyngeal space. According to Barlow,[1] this space reaches the level of the aorta, although its lateral limits there are uncertain.

In an upward direction this space extends to the base of the skull. The layer of fascia which we have previously called the retropharyngeal layer now becomes the pharyngeal aponeurosis. Its lateral limit anteriorly is the pterygo-mandibular raphe. These facts are mentioned here for the sake of convenience, but will be dealt with more fully in the second part of the description. It should be noted here, however, that the retrovisceral layer of the fascia, the prevertebral layer and the medial wall of the carotid sheath maintain a constant relationship to one another throughout the whole extent of the neck.

The Arrangement Above the Level of the Hyoid Bone.

At the level of the hyoid bone all three layers, namely, the investing layer, the sterno-omo-hyoid layer and the continuation upwards of the sterno-thyreoid layer, fuse and are inserted along the body and greater cornu of the bone. Above this point the fate of the various layers is best described separately.

The Investing Layer.

The investing layer sweeps upwards to gain an attachment along a line extending along the lower border of the mandible, the zygomatic arch, the external acoustic meatus and the mastoid process. This layer forms the external fascial covering for both the submaxillary and parotid glands. Laterally it encloses the sterno-mastoid as before. It also gains a special attachment to the angle of the jaw by a connexion passing from the sheath of the sterno-mastoid to the angle of the jaw and the hyoid bone. This is sometimes called the stylo-mandibular ligament.[1]

The Sterno-Omo-Hyoid and the Sterno-Thyreoid Layers.

The sterno-omo-hyoid layer and the sterno-thyreoid layer fuse at the level of the hyoid bone, and thereafter constitute a single layer. This layer is best considered first in relation to its more anterior attachments and then in relation to its more posterior attachments.

Antero-medial to the angle of the mandible this layer, leaving the hyoid bone, sweeps upwards, gives an investment to the anterior belly of the digastric and the mylo-hyoid muscle, and gains an attachment to the mylo-hyoid line of the mandible. In this way the deep layer of the capsule of the submandibular gland is formed (see Figure III). At

[1] Much confusion has arisen on this subject, and it would appear that two distinct structures have been confused. There exists in some mammals, for example the horse, a distinct muscle which extends from the tip of the paramastoid process (arising in common with the posterior belly of the digastric) to the angle of the mandible, and which is known as the stylo-mandibularis or stylo-maxillaris muscle.[2] This is represented in man by a fascial thickening (or ligament, if you will) which extends from the base of the styloid process to the angle of the mandible, and this constitutes the stylo-mandibular ligament *in sensu stricto*. It is thus figured in "Practical Anatomy", edited by Stibbe. But this structure, rightly called the stylo-mandibular ligament, does not separate the parotid and submandibular glands. Another structure performs this function. It is the layer of fascia already mentioned, which stretches from the sheath of the sterno-mastoid to the angle of the jaw. It would seem that this represents a mandibular head of the sterno-mastoid comparable with the *musculus sterno-cephalicus* in the horse. It is on account of the varying attachments of this muscle in the lower mammals that, in veterinary anatomy, it is usually referred to by the non-committal name of the sterno-cephalicus. It is interesting to note that the authors, after arriving at this conclusion, had occasion to consult Testut,[3] and found that he had advanced an identical view.

times above the level of the digastric the fascia is very thin and its continuity is easily destroyed. At the angle of the mandible the fascia is continuous with the layer of fascia uniting the sheath of the sterno-mastoid to the angle of the mandible.

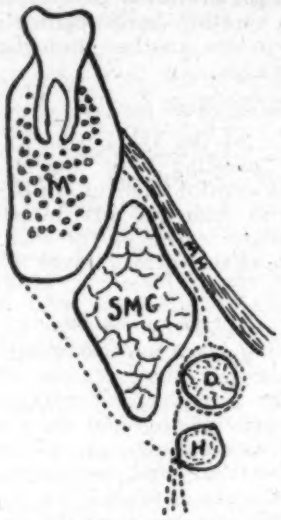

FIGURE III.
Schematic coronal section through the mandible and submandibular gland to show the arrangement of the fascia above the level of the hyoid bone. (*D* = digastric, *H* = hyoid bone, *M* = mandible, *MH* = mylohyoid, *SMG* = submandibular gland.)

More posteriorly the fascia obtains a very firm attachment along the posterior belly of the digastric, which extends as far as the mastoid portion of the temporal bone. Posterior to this the fascia becomes continuous with the fascia covering the muscles which form the floor of the posterior triangle.

The arrangement above described will not be seen in the usual course of dissection described in the various manuals. It is best seen in the *post mortem* or operating room, after the sterno-mastoid has been turned down from its insertion. It will then be observed as a continuous sheath firmly attached along the whole length of both bellies of the digastric muscle and connecting the sheath of the sterno-mastoid muscle with the angle of the jaw. This arrangement is illustrated in Figure IVA, which is a diagrammatic cross-section at the level shown in Figure IVB.

Above the level of the posterior belly of the digastric the fascia is continued upwards as a thinner layer. It successively ensheaths the muscles which arise from the styloid process.

As the great vessels pass beneath the digastric muscle they carry with them a sheath derived from the fascial sheath under consideration. This arrangement is exactly comparable with the condition of affairs found in the infrahyoid region, where the great vessels pass beneath the omo-hyoid muscle. It is important to note that the vessels and the muscles are completely separated from one another by their sheaths.

As stated before, the relation of the prevertebral to the retrovisceral layer of fascia remains unchanged. Their line of fusion continues right up to the base of the skull. In intimate association with this line of fusion we have the sheath of the internal carotid artery. In the superior portion of its extent the prevertebral space, or retrovisceral space of Haenke as it is sometimes called, is divided

FIGURE IVA.
Schematic section along the plane XY in Figure IVB to show the connexion between the sheath of the sterno-mastoid and the angle of the jaw. (*D* = digastric, *M* = mandible, *Ms* = masseter, *SH* = stylo-hyoid, *SM* = sterno-mastoid.)

into two parts by a vertical partition in the midline formed by a fusion between the retrovisceral and prevertebral layers, a fact remarked upon by Lee McGregor in his "Surgical Anatomy".(2)

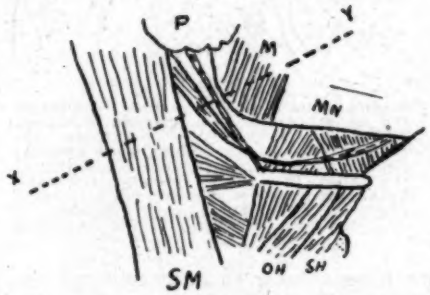

FIGURE IVB.
Thumbnail sketch to show the plane of section of Figure IVA. (*M* = masseter, *Mn* = body of mandible, *OH* = omo-hyoid, *P* = parotid gland, *SH* = sterno-hyoid, *SM* = sterno-mastoid, *XY* = plane of section.)

The authors have been unable to identify the stylo-pharyngeal aponeurosis as described by Barlow.(1) Perhaps it is the fused prevertebral and retrovisceral layers. In point of fact, we have noticed that Barlow's caption "stylo-pharyngeal aponeurosis" in Plate IV illustrating his article, actually represents the line of fusion between the two aponeuroses (see Figure V).

The Lateral Pharyngeal Space.

The backward inclination of the vertebral column and the position of the styloid process, with its attached muscles and fascia, result in the formation of a fascia-covered, chink-like space into which the parotid gland fits.

Laterally there is a strong layer of fascia derived from the investing layer; inferiorly there are, a strong layer over the posterior belly of the digastric muscle and a strong layer attached to the angle of the mandible. The result of this arrangement is

that the only way in which the gland may easily extend is towards the weaker medial area, where it may push the pharyngeal wall before it.

FIGURE V.

Schematic transverse section at the level of the atlas. (*A* = atlas, *B* = buccinator, *C* = internal carotid, *D* = digastric, *E* = external carotid, *F* = fat, *G* = lymph gland, *J* = internal jugular, *LC* = *longus capitis*, *M* = masseter, *Mn* = mandible, *O* = odontoid peg, *PG* = parotid gland, *PT* = medial pterygoid, *Sc* = spinal cord, *SC* = superior constrictor, *SM* = sterno-mastoid, *V* = vertebral artery, *SP* = soft palate, *St* = stylo process.) The stylo-hyoid and stylo-pharyngeus are also shown, but not labelled.

Barlow has devoted considerable attention to the lateral pharyngeal space, and while we agree in the greater part with his description, there are certain points with which we do not agree. The first is in regard to the stylo-mandibular ligament. It is not considered by us that this structure separates the parotid from the submandibular gland. This point has been dealt with earlier in this paper.

Again, it is considered that this space is easy of surgical access. All that one has to do is to incise the fascia along the posterior belly of the digastric, and, by insertion of the finger, the fascial sheaths of the styloid muscles are easily broken down, and the finger can be rapidly passed to the pharyngeal wall and a drain inserted in cases of suppuration.

The third point of difference is the question of the stylo-pharyngeal aponeurosis already noted.

The Sheath of the Internal Jugular Vein.

If the sterno-mastoid muscle is removed in its entirety the sheath of the internal jugular vein will be seen throughout the greater part of its extent. From a consideration of its method of formation, as described above, it is obvious that the only natural outlets from it are along the sheaths of its tributary veins.

In our experience infections of the infrahyoid region provide greater problems in treatment than those in the suprahyoid region. The reason is that there are more layers of fascia; and this fact, together with that of the altered position of the sterno-mastoid muscle in the presence of pathological processes, leads to the formation of *culs-de-sac* which are difficult of drainage.

Summary.

1. A new account is given of the arrangement of the deep cervical fascia in the anterior compartment of the neck, based largely on observations on the living and the recently dead.

2. An attempt is made to show that the arrangement is in accordance with certain general principles.

3. The composition of the sheath of the thyreoid gland and the carotid sheath is discussed.

4. The fascia is described in relation to the submandibular and parotid glands, together with the stylo-mandibular ligament.

5. A means of surgical access to the lateral pharyngeal space is outlined.

6. Certain of the views expressed are compared with those of Barlow.

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(3) S. Sisson: "The Anatomy of Domestic Animals", Second Edition, 1935, pages 262 and 266.
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ON THE IMPORTANCE OF THE GENERAL IN THE STUDY OF THE PARTICULAR: WITH SPECIAL REFERENCE TO RADIOLOGY.[1]

By FRIC W. FRECKER, M.R.C.P. (Edinburgh), M.B., Ch.M. (Sydney), F.B.A.R.,

Honorary Radiotherapeutist, Royal Prince Alfred Hospital; Honorary Radiologist, New South Wales Masonic Hospital, Royal Hospital for Women, Western Suburbs Hospital, and Renwick Hospital for Infants; Honorary Assistant Radiologist, Royal Alexandra Hospital for Children, Sydney.

THE thesis of this essay asserts that there can be no efficient study of any particular phenomenon or group of phenomena without adequate analysis of the general principles involved and, further, that the wider the general analysis, the more truthful and satisfactory the conclusion.

PART I: GENERAL.

This assertion has a wide significance when we consider the recent rise of specialism in modern medicine and, indeed, in modern science and industry as a whole. The intense concentration of mind and effort on small or relatively small fields of endeavour has produced a rank and prolific growth of detail, which from its very complexity threatens to obscure the fundamental pattern of human knowledge by substituting a facile mastery of a limited series of facts and data for a general and philosophical education of the intelligence.

[1] A thesis accepted for the Fellowship of the British Association of Radiologists.

The Nature of Reality and Knowledge.

This thesis to any logical mind is practically an axiom; but though axiomatic, it is totally ignored in daily practice. We become habitually so concerned in the practical utilities of the immediate result that underlying general laws receive but scant consideration and the urge of the driven moment is our sole stimulus. Our final intellectual condition degenerates into a slavish adherence to traditional formulæ such as are known by experience to produce favourable results in given circumstances. The weakness of such empiricism is obvious if we consider the structure of knowledge and of its basis, reality. Every fact is ultimately, whether within or without our consciousness, connected with every other fact, the web uniting them being an infinite meshing of the general laws of cause and effect, both known and unknown. Any one particular fact, act, happening or entity in the past, present or future is the particular and immediate expression of some general law or laws which have a much wider relevancy than the moment and which therefore apply equally to many other particular instances of similar kind. The glories of the rainbow, the iridescence of sewer slime, the prismatic flashing of cut glass and the action of the spectroscope, all have a common denominator in the multiple wave lengths of white light. The knowledge of general law therefore possesses a unifying and simplifying character, which groups multiple and often superficially dissimilar facts under fewer heads and classifications. In addition, it establishes fresh relations between the facts themselves. We may further imagine the existence of a hierarchy of general laws of ever widening scope and significance, which further unify and simplify our concepts of reality, till in the unattainable limit we reach the prime philosophical truth which explains all things.

Even the most haphazard practice of any art, medicine included, will discover strange facts and situations which are unfamiliar and recalcitrant in that they cannot be immediately placed in satisfactory relation to previous experience. Our capacity to deal with such intransigents is in direct proportion to our capacity to generalize and therefore to our general knowledge. A formal adherence to doctrine or authority is useless in such a position; as it has no starting point and therefore no ending. The intransigent fact may, of course, have to remain unexplained and unassimilated until we unearth a general concept or principle capable of absorbing it. The correct attitude of mind is the conviction that general principles exist, whether we know of them or not, capable of explaining every state of being, happening or doing in this universe, mortal or immortal, and that the whole composite body of reality and its image in our mind, which we call knowledge, is intermeshed and shot through and through with general laws of cause and effect.

Education.

Viewed in this way, education becomes a process of unfolding general laws which simplify knowledge by resolving the infinite variegation of fact into a finite number of generalizations—a process of classifying details under fewer and more organized headings. It enables us to appreciate the general significance and relations of any given phenomena and arranges our mind in orderly strata of knowledge because it exposes in part those universal bonds of meaning which tie any one branch of human experience to any other branch. Education thus gives our knowledge an increasing unity as it becomes more complete and teaches us that knowledge is not naturally divided into separate compartments, but is one indivisible whole artificially divided, for convenience and practical utility, into ill-defined, specially related groups of fact and principle known as "the sciences". The geologist, however, finds his studies leading him into the domains of chemistry, physics, astronomy, mathematics and biology; and when we come to the younger and less developed subjects of psychology and sociology, scarcely any fact in human experience is outside their purview. This simplifying action of a liberal and general education is as yet scarcely realized, because education as we mostly know it consists in the wearisome acquisition of mere factual information and procedure.

As a mere radiologist, I marvel at the talent of the composer who writes the score for an opera of thirty or so instruments and voices, achieving wonderful harmonies in the result. Doubtless he also may wonder at my skill in recognizing the manifold abnormalities in the human body. Actually we each only visualize the multiplicity of detail in the other's occupation, and fail, naturally enough, to appreciate the simplifying generalizations which we each use to assist us. Such generalizations are the soul of talent and true education. The miracle is not that we each carry out our function, but that we carry it out so easily—provided we are each efficient. The things that we know in a broad and general way are simplified, because no ordinary situation can arise beyond the reach of our known generalizations. If an extraordinary situation does occur, it is recognized as such from the beginning, and there is no frantic intellectual straining to make inadequate concepts apply. Newer and perhaps wider generalizations must then be sought to cover the new advent, and we at once step from daily practice as usually known into research. The former is an applied art where the end, in medicine, is the advantage of the patient. The latter is the search for truth and knowledge. The two, of course, are not necessarily dissociated or even incompatible; for something of the spirit of research comes into everyone's daily work in varying proportions according to the taste and temperament of the individual. Emphasis is placed upon the intellectual ease and absence of emotional strain which come with real knowledge.

If the state of instruction is wide enough and general enough, no situation can arise which cannot be dealt with in the best manner possible in the circumstances. The physician has by his command of generalities become the master of circumstance so far as such mastery is humanly possible in the present state of knowledge and equipment. This is contrary to the accepted idea, for it is usually considered implicitly that a mastery of technique and detail is the mark of genius rather than a diffuse knowledge spread over a wide field.

Two Attitudes of Mind.

For the sake of the argument, we may distinguish two elements of mind. First and least praiseworthy, what we may term the technician attitude, wherein we follow instruction and authority blindly without much primary regard to reason and design; and, secondly, the intellectual attitude, wherein we give every attention to detail, but with an adequate, intelligent, ranging, widespread consideration of the surrounding medium in which the immediate problem is set.

The first works by rote, by rule of thumb, by routine, by prescription, by formula, reverencing tradition and authority, and rests without question upon the practical achievements of knowledge built up by the brain-work of others. It is essentially the attitude of the practical man who scorns theory. It is successful and practicable only because 99% of our daily activities in any walk of life consist in dealing with situations which repeatedly occur and which are therefore dealt with on familiar lines. Such a mind in contact with the really extraordinary scrambles through its accumulated formulæ, and, failing to find a ready-made solution to fit the occasion, usually manufactures one on a purely scholastic or idealistic basis. In short, given a familiar set of circumstances, the technician method brings sureness of thought and rapidity of action, but it fails absolutely where it meets the unfamiliar. It is the usual mental process of all of us in daily life; for the urgency of the desired end and the endless variety of fact and circumstance prevent any continuous consideration of deep-laid plans and principles. The particular practical detail lies in the mind's eye as the immediate index to the desired end, whilst the general principle is behind us like a sign-post which gives only a general direction toward the goal and is forgotten as we press onwards to the practical consummation. In our haste we are apt to accept names, conventions and symbols for causes, explaining the unfamiliar puzzle of the moment in terms of greater but perhaps more familiar mysteries.

The intellectual attitude, on the other hand, is perhaps slower and more cumbersome, because it is more comprehensive and more complete. It is fashioned to deal with all the ramifications of any particular problem, and is apt to stray from the highways into the by-ways. It may finally even fetch up, temporarily bogged in an uncharted morass. It is designed to elicit truth rather than to attain a technical end, and its practical efficiency in getting things done is not so high as the technician method, for it subordinates immediate utility to eternal philosophy. Once, however, the particular problem passes outside the bounds of routine experience, the intellectual or general method is the only mode of attack available, for the technician outlook is utterly incapable of expanding knowledge. Technical procedure is only the ceremonial ritual of knowledge and, like all ceremony, it is fruitful only so long as the inner grace that inspires it is borne in mind. That grace in scientific work is the awareness of cause and reason in all that is done. Once that is forgotten all degenerates into a frozen, barren automatism, and procedure is governed by a kind of psychological shorthand designed for speed, but not for truth.

The intellectual method is the scientific method which has unfolded to man the problems of the universe and which has been responsible for his gradual and increasing mastery over natural forces and materials. It is designed to probe the unfamiliar. The first attitude gives us a mere technical mastery over some known things, whilst the second gives us a glorious potential mastery over all unknown things and is responsible for all that the technician method is based upon. In one sense technical procedure is only the concrete consolidation of the gains from the intellectual method, and is based upon data available only through the scientific analysis of many general factors. In spite of this we have raised it to the same level as reason itself.

Mind in Relation to Specialism.

Any one mind naturally acts partially on the lines of both methods, though we have artificially separated them for the sake of lucidity; but there is a distinct and increasing tendency, particularly amongst specialists of all varieties, to forget the catholicism of knowlege, to create artificial boundaries or false values, and, generally, as has been said, "to dig themselves into a pit, the rim of which they mistake for the horizon". We lose ourselves in detail, so that we lack perspective, poise and balance, burying our personal talents beneath crushing loads of technical procedure for the sake of the immediate end. There is no leisure to consider the general laws which govern and inspire our technique, whatever it may be, and still less to consider those greater generalities which govern life and knowledge. The "slow music of the spheres" has no meaning for the fevered modern. His cry is, "Produce! Produce!", and a polished perfection of technical action is his highest desire, forgetting as he does that the material end aimed at will pass away, leaving only a sterile dust to mark its passage. The only real, eternal and lasting product of human activity is fruitful thought. Less perishable than the pyramids of Egypt, it rises on "stepping-stones of" its own "dead selves" to higher and yet higher truth. Down the ages come the

names of kings, conquerors, soldiers, priests and philosophers; but those that sound loudest and longest are those of the men who have used the native weapon of human thought to prize open the secrets of the universe, each one leaving man's horizons a little wider than before he came.

The Newness and Complexity of Knowledge.

The recency of man's approach to real knowledge of the universe and the rawness of his actual achievement are not adequately realized. It is not so very many decades since one man could reasonably take all knowledge to be his province and, given good native talent, could even achieve eminence in several spheres during one short lifetime. A Leonardo da Vinci could be scientist, architect, soldier, engineer, painter and sculptor; but in these enlightened days the spate of knowledge is so huge and so various that no man can cope with the detail of more than one single branch. In 1914 the index of the titles alone of scientific publications for the year filled seventeen large and closely printed volumes. Since then the rate has increased; but the majority of these works are achievements of technical detail rather than of general principles. Many of them are written in a professional jargon completely unintelligible to those not initiated. It is so easy to write on facts, so difficult to formulate general truths.

The futility of spreading effort over too large a field and of endeavouring to cope with the impossible has been the primary incentive to specialism; but the contraction of activity is only too apt to contract that mental vision, without which "the people perish".

The initial subdivision of science into departments has been followed by an increasing contraction of field for those who desire to specialize. Some men now spend a lifetime investigating one or two species of animal or insect; the historian limits his intensive study to one period; the physician chooses one region of the body, or even one disease; the ethnologist studies one race alone, and the lawyer one branch of law. The trouble is that life is too short; there is so much to do and so little time in which to do it. We all yearn for omniscience and power over facts, and only in a strictly limited field can we even approach such a flattering condition. Hence specialization, and the temptation to lose our birthright of free thought in little petty kingdoms of our own making.

Specialism and Detail.

This concentration on special problems has been a fruitful method in bringing forward minutiæ which in their aggregate have formed a basis for new generalizations. It is the method to which observation and experiment are eminently adapted; but without real synthetic general reasoning to simplify and coordinate the result, it produces so much lumber in the attic. We just keep it because some day it might be useful. The close application to detailed research keeps the eye only one jump ahead, and tends to limit that free ranging of human thought from which, very rarely, springs the master stroke of intuition or genius that marks the Newton, the Lister or the Röntgen. Our modern mental life is too closely coupled to the pressing needs of the moment; our research strives for immediate results in the shape of more and more data, with less and less capacity to assimilate what we have.

This is not to decry the experimental method, but rather to suggest that its constant application to the minute and the immediate can be very stultifying to the soul unless relieved by an occasional wide-sweeping glance around the horizons of human knowledge. At the least, such an occasional survey will keep the specialist humble, and humility is the soul of intellect just as surely as brevity is the soul of wit.

The study of intense detail is of the highest value; but it becomes a weary pedestrianism unless relieved by spells of flight upon the wings of thought, high enough to see both the rosy sun on the distant mountain peaks and the shadows in the deep and sombre valleys below. It is only by such flights of thought based on general knowledge that we can derive the inspiration which welds the ugly mass of raw facts into the wonderful and satisfying hypothesis.

Progress has been so swift in the last eighty years that the education of the masses has fallen far behind that of the few instructed. The true inwardness of technical achievement won by sheer intellect has not yet penetrated to the understanding of peoples or parliaments; witness the prostitution of science to purposes of slaughter and destruction. What we need is a pause to assimilate our surfeit of discoveries and to instruct ourselves in the uses of the tools to hand—a period of consolidation before we advance further. The ground whereon we stand is littered with bricks and building materials; but no one builds, for all are intent on making more bricks. It is much easier to make bricks than to design a building. What is needed today is more intellectual effort and less monumental industry. Einstein has stated that the greatest contributors to human well-being are those who by feats of thought discover new principles and new generalities which raise human life to higher levels of experience and open up avenues to newer and wider problems. The discoveries of Röntgen certainly come within such a definition. By producing a new and artificial radiation, he gave to physicists a tool which has, in the outcome, changed our whole conception of matter, energy and reality. The general enlargement of scientific outlook which has ensued is the most valuable result of Röntgen's work, far outweighing any practical applications such as those in medicine. Even the philosophers have been led to revise their theories of the ultimate and ontal in the light of all this new material.

The very newness and strangeness of this new world have given rise to startling hypotheses which need the closest examination. There is therefore, in this or any other new field, a paramount necessity for minds of the synthetic type, which can take hold of this chaos, sifting, relating, linking up and ordering, till out of the whole appears that unifying concept which reconciles and explains all differences. Such a control is afforded only by a careful consideration of all the general relations of the subject, together with a rigid testing of each intellectually manufactured hypothesis by experiment and experimental reasoning.

Genius and intellect lie in the ability to formulate inspired hypotheses from the particular facts rather than in the ability to grub around in the laboratory collecting new facts which may, for the time, be of a purely academic nature. Both varieties of activity are necessary; but the intellectual, intuitive summarizing of the data gained or observed is the highest form of scientific activity—and the least cultivated. Research should go directly from the particular to the general. The generalization then becomes the basis of particular prophecy, and the truth of the prophecy is the test of the generalization's virtue. Purposive human thought is thus always a recurring oscillation from the general to the particular, back and forth till truth emerges. No activity, no vocation and no profession can be prosecuted except on the most stereotyped and uninspiring lines, unless it is based on such sound and fundamental principles of reasoning.

PART II: SPECIAL AND RADIOLOGICAL.

In conformity with the spirit of this thesis, I have thus far dealt with the problem on wide and general lines having relation to all knowledge and all intellectual activity. The analysis in general completed, I may now proceed to the examination of the particular object of interest, in this case, the practice of radiology.

The bearing of all this upon radiology as a form of specialism becomes apparent on very little thought. The radiologist is one who takes radiation as his main tool in the practice of medicine. He tries to discover and exploit every quality which promises medical assistance in either diagnosis or treatment. His problem involves the invention and application of many new ways and means, with a displacement and alteration of old values. It is hag-ridden by machinery and technique which in their detail distract him from the true consideration of medicine as a whole. He too easily forgets that the inspiration and aim of all his technique lie as much in genuine all-round medical knowledge as in mere technical efficiency. Too often his actions are governed by impressions rapidly formed and accepted without criticism or analysis in the light of the medical principles already known.

Radiation Therapy.

In radiation therapy we have the interplay of a partially known physical force with an imperfectly known biological material. Our present knowledge is therefore largely empirical, filled with uncertainties and contradictions and lacking in system.

The interaction of radiation and inorganic matter is still largely a conjectural mystery, toward the solution of which we are advancing because we have some idea of the interacting components.

Living organic material, however, maintains itself and multiplies by inner processes of which we have scarcely the faintest conception. Intracellular processes, probably ultra-microscopical, are veiled from us because we have not yet the tools to penetrate their secrets. Chemical reactions take place beyond the sensitivity of our reagents, and growth and metabolism proceed in ways still unknown.

Of what goes on, in this infinitely small world, where wave lengths of incredible smallness act upon the elemental particles and electrons which make up the cell, we must confess almost complete ignorance. The very nature of the radiation itself is doubtful, for at one time it seems a stream of pellets of energy and at another time a series of waves. Yet by taking many unknowns, on either side, and shuffling them up together, we piously hope that a miraculous truth will pop out. The chances are infinitely against us till we set each aspect of the problem into a little more order. If we continue to strain at the immediate technical problem before clarifying the situation in its component parts, we shall only breed more confusion. Until we know more of radiation and more of cellular processes, we have no general basis for reasoning and can only observe empirical facts. Still less can we hope to explain the action of radiation upon neoplasm, for the explanation of neoplastic growth itself still waits upon a complete knowledge of normal cell processes.

Meanwhile our empirical fact collecting is a valuable early stage of knowledge, for it stores up the materials which later and more informed generations will build into a systematic whole. Truth will be better served, however, if the net is cast more widely, to include the life and development of the normal cell, for herein lies in part the explanation of cancer; and by extension, some light will be thrown upon its radiation therapy. The great generalizations in the field of radiation therapy are still to be evolved.

The radiation literature is filled with hypotheses and generalizations, many of which are mere pious aspirations and wish fulfilments. Some of these have been generally accepted and have hampered progress by pushing us away on false scents. The doctrine that short-wave X rays have a selective effect upon cancer cells is widely promulgated. It has led to the installation and use of very high voltage equipment, with all its attendant expense, not only in one or two places where its experimental use would be praiseworthy and justifiable, but in many places. The element of competition between hospitals has entered into the picture, and it has become a question not of medical results but of the mere possession of the highest voltage machines, possibly on the principle that God is always with the big battalions.

It would now seem to most of us that this doctrine of such selectivity is not justified and that the only differences are the purely physical ones of distribution and intensity. After six years of effort the high voltage exponents are singularly silent as to any great achievement, and the tide of preference is slowly turning back to moderate voltages more easily and economically handled.

The fundamental error apparently lay in false conclusions drawn from the action of radium. Particularly in interstitial applications of radium, the results, at the time, far surpassed those achieved by X rays. As γ radiation is very hard, it became the fashion to assume that if we could obtain X rays of equivalent wave length, all the problems of X ray therapy would be solved. We now realize that the excellence of the radium results came directly from the efficiency of the dosage and partly from the time interval over which the total treatment was extended. Where we can apply adequate X ray dosage, as in carcinoma of the lower lip radiated from both sides, by eversion, the results of voltages even as low as 60 kilovolts peak are indistinguishable from those of radium implantation. The results of the radium bomb have not been miraculous, and in many instances have not been so satisfactory as those of X rays, probably because the depth dose is not so high. Regaud has recently declared his conviction that X rays can do all that radium can. The advocates of ultra-high-voltage therapy must bear in mind that Coutard's excellent results came from the use of voltages in the region of 180 kilovolts peak. Chaoul has more recently still demonstrated a highly successful technique with voltages of 50 to 60 kilovolts peak. We shall therefore probably have to retrace our steps from the regions of ultra-high voltage and base our treatment on other concepts than those of increasing selectivity with increasing voltage. With the collapse of this idea, the grounds for much of this very heavy filtration will also vanish and, as ever, we shall finally revert to councils of moderation.

Economically, the abolition of very high voltages and of very heavy filtration will render treatment less expensive, because more of the emitted energy will reach the patient. Time is a very valuable commodity, especially to physicians, and if it can be definitely proven that the time rate of the individual treatment has little effect upon the result as distinguished from the total time over which the series of treatments is administered, medical men in busy departments will be able to treat far more patients per day and thus relieve the congestion occasioned by the slow rates of treatment at present in vogue. Chaoul's results would seem to imply that too great an importance has been attached to both filtration and voltage. His time rate of treatment is in the region of 100 *r* units per minute. It would therefore be interesting to investigate the application of deep X ray therapy at commensurate rates with adequate filtration and distance, for example 250 kilovolts peak, with a filtration of one millimetre of copper, at 80 centimetres distance, sufficient milliamperage passing through the tube to give 100 *r* units in one minute.

A treatment of 400 *r* would then take only four minutes instead of 25 to 45 as at present. The treatments could be spaced, as at present, to extend the total dose of the series over an adequate time interval; for this total duration of the series dose is quite as important as the size of the total series dose itself. The relative unimportance of the duration of the individual treatment is borne out by the results of R. McWhirter (*The British Journal of Radiology*, May 10, 1936, page 287).

Once it becomes clearer that the result does not depend on slowness of rate per minute, or heavy filtration or ultra-high voltage, the administration of very high dosage rates per minute will be forced upon us for economic reasons. Whether this will be achieved by increase of voltage or of milliamperage or of both, will probably be a matter of machine design.

The further discussion of such a technical question is not a matter for a general essay of this character. The problem of ultra-high voltage and heavy filtration has been brought forward as a possible instance of the errors which result when conclusions from a few imperfectly understood technical facts are allowed to influence policy and action without a thorough analysis of the whole problem on general lines.

Numerous investigations on these problems of time and dose are proceeding, and it is from the summarization of all the resultant data that the next valuable generalization of X ray therapy will emerge. Meanwhile, we must realize the inadequacy and fluidity of our present information and examine each newly published finding only in the light of those principles that are known to be firmly grounded and unmistakably established.

Diagnostic X Ray Work.

In diagnosis the specialty has already passed through the stage where particular technical facts occupied all the radiologist's attention and where the manipulation of machinery and the production of plates took all his energies. More recently we reached the stage which was the apotheosis of the film. The problems of apparatus having been more or less solved, every eye was centred on the film as the revealer inevitably perfect and complete—the ultimate criterion of diagnosis based on a single objective fact.

From this precocity we are slowly and painfully emerging, against the wish of our fellow physicians, who only grudgingly acknowledge our medical intelligence and would much prefer to keep us captive like fortune-tellers in tents, casting an occasional medical horoscope at their behest. The radiologist, from the selected nature of his patients, has much more to offer the physician than an opinion on a film. He sees and solves the diagnostic problems of many practices and skims a rich cream of experience, which he can pass on as suggestion or advice if they are welcomed. Viewed from the

radiologist's viewpoint, it is the interplay of clinical fact and principle with radiological fact and principle which will raise radiological practice to its highest level. The radiologist who neglects the study of medicine generally will never rise above a dead level of routine mediocrity.

There is a definite need to indicate the true relations of radiology to clinical diagnosis and clinical therapy—to demonstrate not that X rays or radium will do this better than other methods, but to demonstrate their value in cooperation with the older clinical utilities; not to demonstrate how mitral stenosis can be diagnosed by fluoroscopy, but rather to show how the X ray appearance, the presystolic murmur, the accentuated first beat and the clinical history all combine to make the diagnosis firm and certain. The facts and details of the X ray method we must have; but they give us their maximal illumination only when we follow them into the ramifications of general medicine. In short, medicine, like knowledge, is one indivisible whole, and nothing is gained by brutally wresting it into artificial fragments.

Both branches of radiology, diagnostic and therapeutic, are so painfully new that they are still in a state of flux, and the only stable principles for their present guidance are the old well-proven principles of clinical medicine. The whole subject needs revaluation by minds intelligently sympathetic with the trend of modern practice as a whole, and not by a carping specialism totally absorbed in technical achievement and bent on erecting its own altars to a partisan or sectarian variety of truth. Our diagnostic and therapeutic applications of radiology are only special aspects of general medical problems, and their solution lies as much in the general as in the special aspect, so that it is impossible to divorce the one from the other.

Specialist and General Physician.

The methods of the specialist, including the radiologist, must differ from those of the general physician. The latter is, by the nature of his vocation, a man of action, a meeter of emergencies, a practical healer, compelled to cover a vast field of ever-increasing complexity. Though it is the modern fashion amongst specialists to scoff at his errors, his widespread efficiency actually should excite our highest admiration. The practitioner's attitude must inevitably be that of the technician in much of his work. Having to act, he must intimately know the details even if the general principles do not trouble him. The accent is mostly on the particular "How?" rather than the general "Why?" But even as a man of action he should and must develop a greater general knowledge of all the fields of medicine, including a general outline of the specialties; otherwise he cannot exercise his true function, which is to judge calmly and justly what is best for his patient in a manner free from any tinge of specialist prejudice or bias. The task presented him is enormous; but no tasks worth while are ever easy. At present there is too great a subservience of intellect on the part of the general physician, with a tendency to elevate the so-called specialist to a throne where he is above criticism and reproach, his dicta being the final pronouncements without any appeal to common reason or even common sense. To a certain extent the authority of specialism must prevail; but this does not mean that any statement or opinion under the seal of technical authority shall be blindly and uncritically accepted. The frequency of such a slavish attitude of mind shows how completely reason may be dominated by a terror of the technical fact.

In medicine the general body of the profession is the only possible competent judge of the value of specialist action and opinion. These latter are notoriously subject to professional prejudice. If physicians as a whole simply gape in reverential awe at the words of an exhibitionist specialism, all restraint vanishes and medical extravagance appears. The main hope for modern medicine, and for modern specialism too, lies in the increasing ability of general practitioners to criticize and qualify the actions of those specialists to whom they refer their patients. This ability is based upon an increasing appreciation of the general principles of medicine to which the particularities of all specialism are subordinate.

In diagnostic radiology this is especially evident. The radiologist is apt to have his opinion and interpretation sharply questioned, and must be prepared to argue the pros and cons of his finding in terms of general medicine without taking refuge in technicalities. The well-instructed practitioner insists on seeing the pathological slides and X ray films of the patient for himself, has a decided mind of his own, and definitely resists any attempt to impose upon him a diagnosis or treatment which does not conform with his own clinical findings and opinions. In therapeutic radiology, where no really systematic development of the subject has yet taken place, this tendency is not seen; for it is difficult to say what is right and what is wrong, no standards being present. Rather cynically one may say that it is much easier to practice X ray therapy than X ray diagnosis, for the judges are neither as numerous nor as competent.

The Function of the Specialist.

The specialist, on his part, has also to decide and to act, though in a more limited sphere. Details he must know in great profusion; but it is a definite charge upon him to know the principle as he knows the fact, and to follow his vocation to the edges of the known and beyond it, if he can. Otherwise there is no virtue in his specialism, but only mere intellectual softness and the desire to cushion his own efforts. As a further expansion of this ideal it lies upon the specialist to decipher his own specialty to the physician, to make light the dark places, to elucidate and publish the best methods, and positively to renounce any copyright in his own knowledge. It most certainly is not his function

to emphasize the difficulties of his vocation; but rather should he make plain how easy all things are, given the requisite education. He who advertises that the way is difficult renders his intellect and training suspect to the understanding mind; for the prime function of specialism is to advance and simplify knowledge and not merely to promote an impressive technical efficiency. He should be the architect and designer of the structure of medicine rather than a mere carpenter, eternally sawing wood and leaving a useless sawdust of facts as his sole achievement. The greatest capacity for advance, the finest opportunity for the discovery of new principles and methods, and the grandest destiny lie before the specialist, but only if he tinctures his detailed studies with a due proportion of general knowledge and even of general achievement. This means that specialism must not be too detailed or too intense if intellectual myopia is to be avoided.

Above all he must realize and keep constantly in the forefront of his mind that his vocation is derived from and bears back upon the body of medicine as a whole. It is a small field handed to him to till to the best of his ability, the crop being special knowledge, to be broadcast to the profession at large as needed. The crop may be special, but the general principles of agriculture are the same and are still worthy of study if the best is to be achieved.

Radiology and Specialism.

Radiology fortunately does not lend itself to an ultra-close specialism, bearing as it does on most problems of diagnosis and treatment. Its particular brand of myopia is a conceit that it is a thing apart from and above clinical medicine. There is, however, a tendency, especially abroad, in large centres of population, for the radiologist to confine himself even more closely to special branches of diagnosis. Some confine themselves to children's diseases, and some to the examination of the ear, nose and throat, and a few to the examination of the alimentary tract. Such a close specialism within a specialism is to be deplored, as it inevitably breeds an intellectual narrowness and fosters a race of super-efficient radiological technicians. The immediate results in the selected limited sphere are extraordinarily satisfactory from the practical point of view. Pursuing such a policy to its logical sequence, however, we should finally come to that stage where each group of specialists lived in the separate cells of an intellectual honeycomb, isolated one from the other and with little power of that coordination which means advance. If the field is too narrow, it is too soon approximately exhausted and mastered, so that effort ceases and the radiologist becomes a robot, passing patients through his machine with a remorseless but deadening efficiency. It is generally said that no radiologist can practise both diagnosis and therapy, but to my mind the combination is ideal; for the dissimilarity of the two occupations prevents freezing of the mind, gives detail and variety to life, and keeps intellectual effort vigorous. The magnitude of the double task is its best recommendation from our present point of view.

There is much to be said for the American idea of handing the technical work in X ray diagnosis and therapy to specially trained lay technicians, for it leaves the radiologist's energies free to grapple with wider and more medical problems, and emphasizes that he is a directing medical intelligence rather than a mere mechanical hand.

Ideal Specialism.

The solution of the problems raised by specialism lies, therefore, in a relaxing of the intellectual boundaries now maintained around each special sphere. Each of us must be a student of medicine as a whole primarily, and a student of a special branch secondarily. This would seem best achieved by approaching the specialty through the route of general practice. General problems personally experienced in practice over many years give the correct preliminary training for the specialist and lead him to appreciate his place in the scheme of progress, intellectually, politically and economically. The ideal organization of the profession would be one where every man began as a general practitioner and graduated with age and experience into the ranks of the specialists if and when he so desired. Only thus could each section be made to understand all the problems of the other, and only thus could maximal efficiency be secured. The opportunity to specialize should be the reward of good and faithful general work in the beginning. Such a process would be infinitely superior to the academic gilding of adolescent minds with premature technical degrees.

On the other hand, it would also seem advisable that every general practitioner should give particular attention to some special problem or series of problems in his own daily practice; for only then will the mutual relation of particular fact and general law be made plain to him. The works of Sir James Mackenzie bear witness to the value of such studies. The special concentration reveals the particular fact, but only the general training can elucidate the meaning.

It is only by such means that knowledge and practice will be raised to higher levels, and not alone by the intense and minute assaying of closely limited problems; for the bonds of cause and effect range widely and strangely and the missing clue is often found in the most unexpected places. An effort too close linked and too concentrated thus defeats its own purpose and finally dies amidst a sterile clutter of academic information woven by sheer intellectualism into scholastic patterns of a spurious integrity. The very patent industry and honesty behind such an effort may compel the acceptance of error as truth, putting back the march of progress for a generation.

No knowledge is waste. The wider our minds and the more liberal our education, the greater is our potential achievement and certainly the higher is our joy of understanding.

Radiology neither more nor less than other subjects should exemplify these principles. Based on a particular method, it lies subject to general medical law, as do all medical methods. The medical education, the reading and the training of the radiologist should be as wide as time and opportunity allow. He should follow the interests of any particular subject wheresoever they lead him, however remote from routine radiology, continually controlling, directing and refining these interests towards the revelation of fresh medical truth previously hidden. Such a trail, like education itself, never ends; but its pursuit as vista after vista opens up before us is the prime motive of any real scientific endeavour in radiology.

The particular goals of radiology must always be consistent with and subordinate to the general criteria of medical practice as a whole.

THE ECONOMIC ASPECT OF INDUSTRIAL SURGERY.

By J. C. BELL ALLEN, M.B., Ch.M., F.R.C.S. (England),
Honorary Senior Surgeon, Royal South Sydney Hospital; Honorary Assistant Surgeon, the Eastern Suburbs Hospital, Sydney.

SICKNESS and injury play an important part in the economic life of the community, affecting both industry and the individual. It behoves us, therefore, and particularly those of us who are dealing with industrial injuries, to reduce that loss to a minimum. In many instances, with careful selection of the type of operation and attention to after-treatment, it is possible to hasten recovery beyond the present accepted routine period. A few suggestions are put forward for the consideration of readers. They are based on personal experiences which have given satisfactory results with uniform consistency, and are set down in the hope that a more active interest in this aspect of surgical practice may be stimulated.

The Inguinal Hernia.

Consider that not infrequent industrial injury, the indirect inguinal hernia. The common practice necessitates three weeks in hospital and a total period of incapacity ranging from twelve to sixteen weeks. During this time the worker is paid two-thirds of his average weekly wage, for example, £3. Thus he is losing £1 10s. per week, or £18 to £24 in all. Frequently this loss means his falling into debt and being unable to pay time-payment instalments, with the possible loss of the article under purchase. Obviously this is a serious position.

The insurer is called upon to pay the hospital at the rate of £3 3s. per week, which makes a total of £9 9s. Wages cost another £36 to £48.

Industry has lost a possible skilled worker, whose replacement may lead to makeshift arrangements with loss of efficiency and reduced output either in quantity or quality. For every ten employees suffering from a hernia of industrial origin, approximately three years' working time is lost to industry; and industry, although the insurance company pays the cheque, will ultimately bear the cost of this enormous loss.

It is strongly felt that surgeons should make every effort to reduce this economic loss. It is believed that this can be accomplished, and increasing experience strengthens this belief. On the assumption that primarily the indirect inguinal hernia is in itself congenital, and that the only traumatic element is its appearance, the arguments in favour of which have been so frequently and so well set out that it is needless to reiterate them, it is the writer's practice to deal only with the sac, stressing the importance of its complete removal. To do this it is not necessary to divide either muscles or fascia, beyond splitting of the cremaster muscle. The complete sac can then be dealt with below the external ring. As the incision then involves only the skin and fat, recumbency for three weeks is quite unnecessary. The patient is placed in the sitting position when awake, and is allowed out of bed on the third or fourth day. He leaves hospital in a week, takes regular daily exercise in the form of walking, and is fit to resume work at the end of four weeks. The resultant loss to the worker is £6, as against the £18 to £24 mentioned above. The cost to the insurer is £3 3s. for hospital fees, as against £9 9s. The payment to the worker is £12, as against from £36 to £48. The loss to industry is of four weeks' duration, against twelve to sixteen weeks. The saving to the worker is £12 to £18; to the insurer for hospital fees it is £6 6s., and to the insurer for wages it is £24 to £36. The total saving is from £30 6s. to £42 6s., which is equivalent to eight weeks to twelve weeks to industry. Thus for ten herniæ approximately two years' working time is saved. In the above figures theatre, operation and anæsthetic fees have been omitted as being constant.

Recurrences are no more common after the above procedure than after other types of operation; in fact, statistics show them to be less. Further, the repair of a recurrence presents fewer problems, owing to the absence of scar tissue resulting from interference with muscle and fascia at a previous operation.

With a direct inguinal hernia the problem is of a different nature. As some form of plastic operation must be performed to repair the gap in the abdominal wall, sufficient time must be given to allow consolidation; and yet sufficiently early movement must be instituted to prevent further weakness from the muscular atrophy of disuse. I both permit and encourage movements within twenty-four hours; I allow the patient out of bed on the fourth or fifth day and allow him to leave hospital in ten days. A return to light work, such as clerical work, is allowed in one month, and to labouring in six weeks.

The security of a wound depends on the efficiency of its suturing. Knots must be secure, and the

material used must be of the same tensile strength as the tissue which it must hold. If the surgeon has any qualms in permitting early movement, so important in the maintenance of muscle tone and in the prevention of wasting, surely those qualms must be as to the efficiency of his stitching and not as to the tissues themselves. It is suggested, therefore, that he should carefully consider the suture materials he is using and should satisfy himself as to their efficiency.

The Torn Meniscus.

A second frequent industrial injury is the torn meniscus of the knee. Here again an appreciable reduction in economic loss can be effected. It is again my practice to institute active movement the day after operation. On the third day the patient is allowed up and is encouraged to walk, using a stick for support. Splinting I have not found necessary. Patients leave hospital in one week, with instructions to walk every day up to the point of tiring. Careful supervision is necessary to prevent undue exercise on the part of some enthusiastic patients, and to see that satisfactory joint movements are carried out. Massage is seldom necessary, a further saving of cost. The cooperation of an interested patient produces a more rapid and satisfactory result. The disability after removal of the torn cartilage results only from weakness of the quadriceps, for which active exercise alone is the cure. A return to work should be permitted in six weeks for the clerical or semi-clerical worker, and in eight weeks for the labourer. Sixteen weeks of incapacity should be unnecessary.

The question of compensatability plays, as is well known, an important part in the rate of recovery after an injury.

This is well exemplified by a patient with a torn medial meniscus who was recently under my care. Operation was performed on Wednesday morning; on the following Monday the patient returned to his office. Within three weeks he was walking without a limp, driving his car and complaining only of some weakness on walking down stairs. In this instance no compensation was payable.

From those who are opposed to early walking after excision of a meniscus I should be glad to learn their reasons, since in my experience I have been unable to observe any contraindication to this practice.

While on the subject of legs, I should like to mention the problem of the Pott's fracture. This does not affect the insurers, as they are averse to an injured worker's returning to his occupation while still partially incapacitated or incompletely cured. The reason for this attitude passes my understanding. Here I suggest that they might add their modicum of relief to the industrial burden by instituting the practice of encouraging the injured worker to return to at least a portion of his duties. Occupation, particularly when an injury necessitates prolonged convalescence, is the best medicament for the accompanying psychological trauma, quite apart from the reduction in the loss of working time and in financial loss to the workers.

But to revert to Pott's fracture. By the application of a Delbet plaster it is possible within a few days for the patient to wear a large shoe and to walk in reasonable comfort with a stick and so return to clerical types of work. In this plaster freedom of movement is permitted at the ankle and mid-tarsal joints, the subastragaloid joint only being confined. This freedom of movement prevents the joint stiffness that so frequently follows immobilization of the foot in a complete plaster. Subsequent swelling is also absent. Thus the cost of massage and mobilization is obviated, in addition to the other advantages of this method of treatment.

Burns.

Burns also are a source of serious incapacity and industrial loss. Fortunately the tannic acid method of treatment is now so universally recognized and practised that further references to the initial treatment of these injuries is unnecessary. I should like, however, to refer to the later granulating stage, in which, I believe, there can be considerable saving of time and prevention of later deformity. I would refer to early skin grafting—either Thiersch grafting, which has the greatest application, or tube grafting with skin and fat. Deformity following burns is a result, apart from actual loss, of contraction in scar tissue. Scarring is at a minimum where raw surfaces are covered. Thus, when granulating areas are covered with skin, deformity ceases.

As an excellent example of this I cite the following case.

A man, recently under my care with a "degloved" hand, developed during the tedious process of covering his hand with skin, a severe palmar flexion deformity of his wrist. Under anæsthesia the wrist was mobilized and dorsiflexion was restored. During this manipulation the skin in front of the wrist split, exposing the underlying fat *et cetera* to a width of approximately 3·8 centimetres (one and a half inches) at its centre. Into this gap a Thiersch graft was placed, with the result that there has since been not the slightest tendency to deformity.

I commend, therefore, the practice of early Thiersch grafting to the granulating areas left after the separation of sloughs. Before grafting is carried out cultures should be made. *Bacillus pyocyaneus* does not appear to be of consequence; but in the presence of *Staphylococcus aureus*, *Bacillus coli communis*, or both, grafting is delayed. Streptococci are in my experience somewhat unusual. Methyl violet (2%) in aqueous solution has been found of value in clearing up infection with *Staphylococcus aureus*; and a solution of sodium citrate in saline solution is of help in the presence of *Bacillus coli communis*.

Where heterogeneous grafting is used, as is sometimes necessary especially in small children, it has been my practice to select a donor from the same blood group. Whether this is essential I do not know; for I always remember that a colleague successfully made a Thiersch graft on a female patient, using a sucking-pig as a donor. May the site be worthy of the skin!

Thiersch grafting has tremendous possibility in those injuries in which there is loss of skin. Quite satisfactory results are obtained from their direct application to tendons, especially if the sheaths are intact. Even directly applied to bone the grafts have taken well; and unless they are in a pressure area quite a satisfactory result follows. In fact, instead of immediate Thiersch grafting to bone being regarded as only a possibility, it should be an absolute rule, since it prevents the occurrence of osteomyelitis. Tube grafting should be left to be carried out at a more opportune time, should it be required.

Injuries to the Hands.

Injuries to the hands are no doubt the most frequent and the most costly of industrial injuries, as well as being amongst the most serious, for few do not work with their hands. Infection following an injury takes toll of many a finger, and even of hands. The resulting stiffness spells loss of efficiency. Here it is opportune to recall to mind the urgent need for complete excision of all wounds within the shortest possible time. As this duty usually devolves upon the casualty surgeons of a public hospital, may I earnestly commend this practice for their consideration. I realize that routine *débridement* is a tedious procedure, often requiring general anæsthesia and consequent delay in clearing of the casualty department. If all foreign material can be removed by excision, healing by first intention will result in 100% of cases. Success is probable up to about four hours after the injury; and as a warning, pin not your faith to antiseptics. As a generalization, few, if any, are efficacious as sterilizing agents in wounds of this type. It has been stated that amongst insured persons in America 87,000 years are lost annually through infection of wounds, in the ætiology of which faith in antiseptics of doubtful efficiency plays a large part. My own practice is to do all cleansing myself, prior to excision, with a 10% iodine solution followed by spirit. I have found no occasion to vary this routine practice.

Once infection of the hand has occurred definite rules must be followed if an ultimate good result is to be obtained. A thorough knowledge of the anatomy of the hand and an even more thorough knowledge of the principles of hand surgery are essential. For this the masterly work of Alan B. Kanaval, "Infections of the Hand", a copy of which should occupy the most prominent position in any casualty department, is unexcelled.

Conclusion.

In conclusion, the object of this paper is to stimulate greater interest in the economic aspect of surgery in general and in industrial surgery in particular; this in contradistinction to the technical side, which has reached a high degree of efficiency. The enormous cost of repair of the inguinal hernia has been to some extent pointed out. As for the remainder, one does not have to exercise the imagination unduly to become appalled at the enormous financial burden shouldered by industry, upon which the cost must ultimately fall. A few only of the common traumatic conditions have been mentioned; countless others must suggest themselves to the busy surgeon. Non-compensatable sickness has not been touched upon; but at once such common conditions as appendicitis, duodenal ulcer *et cetera* come to mind. But little consideration will remind you of the comparatively large cost to the individual. Apart from hospital and medical charges, the one month away from work on account of appendicitis represents a loss of one-twelfth of the wage earner's annual income.

It is to be hoped that some of the remarks herein contained will stimulate at least comment; even better, publication of the methods used by other surgeons, by which the recovery times of specified injuries may be shortened without the sacrifice of efficiency, would be welcome. Would it be too much to suggest that medical men actively engaged in workers' compensation practice should publish brief statistics in the pages of this journal, informing the profession in general of the average period of incapacity associated with specified injuries? In this way cooperation in reducing this period to the absolute minimum consistent with sound results would be invited.

Reports of Cases.

A CASE OF RECTO-VESICAL LIGAMENT.

By B. E. WURM, M.B., B.S. (Adelaide), L.M., D.C.O., (Dublin), D.C.O.G. (England),
Clinical Assistant to the Gynæcological Department, Adelaide Hospital; Assistant Obstetrician to the Queen's Home, Rose Park, Adelaide.

Clinical Record.

Mrs. B., aged twenty-one years, consulted me on April 29, 1937, for pelvic discomfort associated with her menses, and sterility. She had had one pregnancy, but had miscarried at four months. This was eight months prior to her consulting me; and since then her menstrual periods had been more painful than before. Her menses were regular and normal in amount. They had begun at thirteen years. The patient was the twelfth child in a family.

General examination revealed no abnormality. Vaginal examination revealed the vagina and cervix as normal. The uterine body was retroverted and displaced to the left and was apparently fixed. It could not be moved manually. Above the right fornix I felt an apparent matting.

Four weeks later the patient returned. She thought her discomfort was worse, in spite of tonics and exercises. On account of the supposed fixation of the uterus and matting of the right adnexa, I advised a Gilliam operation.

Under ether anæsthesia the sound was easily passed to the left and backwards. On opening the abdomen I found the uterine body back and to the left, with a single ovary and tube posteriorly. In the mid-line of the pelvis was a distinct, complete dividing band. This band was thick, and stretched from the apex to the posterior wall of the bladder back to the posterior wall of the pelvis, ensheathing the pelvic colon like a double mesentery. To the right of this band was a similar uterine body, with tube and ovary as on the left side. Both uterine bodies and adnexa were of normal size, the

bodies meeting at about the level of the internal os in the bottom of the pelvis and under the cover of this midline band or septum. The abdomen was closed after this internal inspection. I had at the beginning of the operation tried to inject lipiodol into the uterus, but had failed. Apparently this was owing to the uterine junction within the cervix interfering with the insertion of the instrument. The condition is interesting, owing to the absence of the broad ligament laterally and the presence of this recto-vesical ligament.

Baldy, in 1899, mentioned a case reported by Schrader, in which the rectum apparently descended between two uteri.

The old *American Cyclopædia of Obstetrics and Gynæcology*, Volume XL, mentions this abnormal recto-vesical ligament.

Embryologically this condition must be of great interest. It must arise before the formation of the original urogenital diaphragm and the approximation of the Müllerian ducts before the eighth week. Possibly there is some early enlargement with adhesion of the vesical and intestinal canals, which later return to normal size; and the peritoneum, which had not developed as usual while they were in apposition, is in the return to normal size put on a stretch and develops into this fold or extra mesentery that later develops with the organs. Early adhesive inflammation would not leave a scar, but a ligament. I cannot find any mention of this recto-vesical ligament in any of the late gynæcological text-books in my possession.

This woman became pregnant, her last menstrual period ending on November 6, 1937. She was given four injections of two milligrammes of "Proluton" over the period from January to April, 1938, the last being on account of definite vaginal bleeding for which she was confined to bed for one week. Her pregnancy was in the right horn and remained largely on that side of the abdomen, reaching to the costal margin and with increasing obliquity. At thirty-four weeks the breech presented, but could not be turned, on account of the tubular shape of the uterus. From the thirty-eighth to the fortieth week slight toxæmia was present. This responded to elimination treatment. The uterus became more difficult to straighten in the line of conformity with the axes; and for the last fourteen days this alteration of position was definitely painful. At no time did any part enter the pelvis; and the position became more and more transverse.

At ten days after term medicinal induction was tried without response. At fourteen days a healthy, full-term child was delivered by Cæsarean section. The non-pregnant horn was examined. It was found to be practically normal in size, lying fixed to the postero-lateral wall of the pelvis as before. There were only a few ounces of almost milk-like liquor present. Convalescence was uneventful.

Discussion.

I admit a trial of labour would have been interesting, but there was apparently a poor development of the lower uterine segment and a very apparent risk. The child weighed only 2·7 kilograms (six pounds) at birth. The father is a small man, weighing only 53·9 kilograms (eight stone seven pounds).

Reviews.

SKIN LESIONS OF CHILDHOOD.

THE period during which infants are breast fed shows an astonishing variation in different countries. Perhaps it is a virtue peculiar to some American parents to lavish the care and protection due to infancy on their offspring until the children have reached years which are no longer regarded as tender in this country.

A perusal of "Skin Diseases in Children", by Dr. G. M. MacKee and Dr. A. C. Cipollaro,[1] leaves the impression on the reader that it is devoted more to adolescence than to infancy. The high repute of its authors and the international fame of one of them are at least guarantees of an efficient production. The book is indeed well written, avoids extremes, is a good work of reference and is well illustrated. We finished our reading of it, however, with a certain feeling of disappointment. It enumerates and describes in satisfactory detail the diseases treated in many standard hand-books of dermatology written for practitioners, and particular emphasis is laid on those lesions which affect young patients. But it would appear that the authors are dermatologists first and always and not pædiatricians. One of the most interesting chapters deals with infantile eczema. Dr. MacKee and Dr. Cipollaro point out that many children thought to be affected with infantile eczema are really suffering from infectious eczematoid dermatitis.

The illustrations are excellent. They include a few "old friends", but the majority of the photographs are new. The printing and paper are splendid. This is a sound informative book, but not one likely to cause a conflagration on the Thames, nor for that matter on the Hudson.

EMERGENCY SURGERY.

Two years only have passed since the second edition of Dr. Hamilton Bailey's "Emergency Surgery" appeared in one volume. The third edition is now to hand, and except for some improvements it is much the same as the second edition.[2] An appendix, added after the work went to press, elaborates upon certain subjects discussed in the body of the book and serves to bring it up to date. We repeat our previous opinion that this is an excellent book which is interesting and instructive throughout.

MOTHERCRAFT.

"THE AUSTRALIAN MOTHERCRAFT BOOK" has been written by various authors at the request of the Mothers and Babies' Health Association of South Australia.[3] It is a complete guide to mothers in the care of themselves during pregnancy and lactation and the care of their children during infancy. This book is designed to meet the needs of peculiarly Australian conditions. A warning is issued against over-indulgence in sunbaking, and the need for care in the administration of fats and oils in hot climates is stressed. No detail of nursing management is forgotten in this little book. The selection of the necessary furniture is wise and economical, and there are the usual details about children's clothing.

The management of breast feeding is described in full, but this book is unexampled in the simplicity of its instructions for artificial feeding. The four milk mixtures, simply composed of various strengths of milk, water and sugar, are described, and the directions can be followed easily by the busiest and most inexperienced mother. A necessary caution is given about the administration of emulsion and orange juice; these substances often upset infants, whose feeding recipes should then be prescribed by a competent medical man. There is a brief chapter on the care of the premature baby. An excellent section treats of the normal physical and mental development of the child and the psychological aspect of his management. The last chapters deal with common nursery ailments and accidents and the care of the health of older children.

This Australian production is the most complete mother's guide at a cheap cost that has come under our notice. It is well written, methodically arranged, clearly printed and usefully illustrated.

[1] "Skin Diseases in Children", by G. M. MacKee, M.D., and A. C. Cipollaro, M.D.; 1936. New York: Paul B. Hoeber Incorporated; Australia: Angus and Robertson Limited. Medium 8vo, pp. 262, with 153 illustrations. Price: 33s. net.

[2] "Emergency Surgery", by H. Bailey, F.R.C.S.; Third Edition; 1938. Bristol: John Wright and Sons Limited; London: Simpkin Marshall Limited. Medium 8vo, pp. 852, with 816 illustrations, of which many are in colour. Price: 50s. net.

[3] "The Australian Mothercraft Book", by Various Authors; 1938. Adelaide: The Mothers and Babies' Health Association of South Australia. Crown 8vo, pp. 184, with illustrations. Price: 2s. 6d. net.

The Medical Journal of Australia

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ROYAL AUSTRALASIAN COLLEGE OF PHYSICIANS.

THE inauguration of the Royal Australasian College of Physicians, which is to take place on December 13 and succeeding days, is an outstanding event in the medical history of Australia and New Zealand. It is fitting that the ceremony should be held in the Great Hall of the University of Sydney, thereby demonstrating the happy union in spirit of this new body with the older academic institutions. The Australasian Colleges of Physicians and of Surgeons are not licensing bodies as are their British prototypes, but their function is a very important one, being that of setting and maintaining a high standard in their respective special forms of practice.

The Royal Australasian College of Physicians has modelled its constitution upon that of the Royal College of Physicians of London to the extent that it admits two grades of medical practitioners, members and fellows, and its powers of government are vested chiefly in the fellows, though the members, when their number will have reached one-fourth that of the fellows, will have the right of representation on the council. The object that influenced the founders to recognize the grades of member and fellow was to encourage medical graduates to become members without regard to the form of practice they followed, thus allowing them the privileges of union with the college whether they were engaged in academic work, in public administrative medicine or in general practice, including the ordinary run of surgical and obstetric work. From the fellows, however, will be demanded a higher standard of achievement and a greater restriction of work, as they will be engaged in consulting practice as physicians and in medical teaching, or will be following the ancillary branches of scientific medicine. It is already a policy of the college to encourage physiologists, pathologists, dermatologists and radiologists to enter its ranks, and among its foundation fellows are representatives of these branches of the profession.

To envisage fully what the influence of the college will be, it is necessary that we should look forward a generation. Eventually the fellows will all have passed through the preliminary door of membership, and after a period of labour in any cognate branch of professional work they will have attained such eminence in medicine and manifested such devotion to its cause as to deserve elevation to the rank of fellow. Thus there will be nothing to discourage the aspiring consulting physician of the future from spending a few invaluable years in the broadening field of general practice, and the pathologist, biochemist or radiologist may similarly come to his work all the better equipped for having gained a higher qualification in pure medicine. Membership is gained by examination only; but it is wisely provided in the regulations that candidates possessing a recognized higher medical qualification will be excused from a written test—a privilege that may also be extended during the next five years to practitioners of not less than fifteen years' experience. This recognition on the one hand of the value of the qualifications, such as the higher degrees conferred by universities, and, on the other, of the practical wisdom attained by general practitioners in caring for the health of the public, should appeal to all. We may therefore look forward with optimism to the working of this leaven in the medical community. The new college will be no rival of the

universities, but a colleague; and in its devotion to scientific medicine it will speak with one voice for Australia and New Zealand. Its State and Dominion committees will bind its members together by local scientific gatherings of physicians, in this way avoiding the sterilizing tendency of the huge territorial area over which its members are scattered.

The Royal Australasian College of Surgeons, safely launched and forging ahead in seaworthy fashion, is now followed by its sister ship, the Royal Australasian College of Physicians. Cooperation between these bodies is already assured; for their interests, though different, have strong bonds of union. It is interesting to reflect on the difference between the physician and the surgeon. It is not one of knowledge; for overlapping of interests is essential to a good exponent of either art. Neither is it entirely one of technical skill and aptitude; for the physician of today, though he does not pretend to the surgeon's manual gifts, is not so bound by the convention of earlier days that he may not perform minor procedures like artificial pneumothorax or even bronchoscopy and gastroscopy. The difference is rather one of outlook; for the physician is in a sense the philosopher of medical practice. Though it is given to few to devote themselves to the arduous calling of the specialist in internal medicine, it is certain that it is to the advantage of medical science, and above all to the public, that something of not only the physician's learning but his quality of mind should be as widely diffused as possible through the medical community.

The Royal College of Physicians of London is sending a special representative in the person of Dr. Morley Fletcher to attend the inaugural meeting, and by his hands is presenting a caduceus to the Australasian college. The familiar symbolic serpents of Æsculapian knowledge and tradition indeed need the wings of Mercury in these spacious lands of great distances, and in this gift we may see also a happy augury for the future, the establishment of a succession and a tradition, and the sealing of the bond, already strong, of learning and vocation, of race and of empire.

Current Comment.

NICOTINIC ACID IN THE TREATMENT OF PELLAGRA.

AN exhaustive investigation of the use of nicotinic acid, nicotinic acid amide and sodium nicotinate in the treatment of classical and subclinical pellagra has been made by T. D. Spies, W. B. Bean and R. E. Stone.[1] When in 1937 it was demonstrated that nicotinic acid cured canine black-tongue, the same substance was employed for human pellagra. It was found that nicotinic acid and allied substances conspicuously blanched the erythematous dermal lesions of that disease, produced healing of the glossitis, stomatitis, vaginitis, urethritis and proctitis, and reduced the urinary porphyrin to normal. When the drugs were exhibited in very large doses, flushing, burning and itching of the skin occurred. Spies and his colleagues now report on the effects of these drugs on normal human beings and on those afflicted with pellagra. Studies were made of seventy-three persons afflicted with endemic pellagra. In eleven of these the disease complicated a state of chronic alcoholism. As investigation of the children in some hundreds of "pellagra families" had shown that many of them displayed evidence of early pellagra, they were included in the investigation. It was noted that early manifestations were more vague and difficult of recognition in children than in adults. In many instances the mother's diet during pregnancy was inadequate. Often the child was a "feeding problem" from birth. Thirty-six children had glossitis and dermatitis characteristic of pellagra. After the administration of nicotinic acid or one of its compounds they exhibited increased well-being, with disappearance of symptoms. A similar response was given, after ingestion of nicotinic acid, by ten children who did not show characteristic evidence of pellagra. The investigators consider that a slowly progressing deficiency in the anti-pellagra factor existed in the children studied, even though diagnostic evidence of pellagra was a late development. Two hundred persons suffering from subclinical pellagra were also studied and further investigation of some of the reactions already noted in pellagrins after oral or parenteral exhibition of nicotinic acid was made on one hundred normal adults. The authors' observations of the response to the nicotinic acid group in the seventy-three pellagrins in relapse and in persons with subclinical pellagra suggest that these substances are necessary for proper nourishment of the cells. Examination of the case histories of several hundreds of pellagrins in a state of relapse indicates that three factors may operate to produce deficiency of these substances in human beings. There may be insufficient consumption of foods containing nicotinic acid. Absorption of nicotinic acid may be subnormal, owing to abnormalities of gastro-

[1] *The Journal of the American Medical Association*, August 13, 1938.

intestinal function. Intake may be sufficient and absorption may be adequate for an average person, but the requirement may be increased on account of excessive exercise, hyperthyreoidism, insomnia or other states. Spies, Bean and Stone admit that the role of nicotinic acid in bodily nutrition is obscure and that studies of this compound have been insufficient to elucidate its effects on the body cells. It would appear that its lack caused cellular alterations in the alimentary tract, skin and other tissues and leads to a change in porphyrin metabolism. It is known that the porphyrinuria not only of pellagra but also of other disorders has diminished after nicotinic acid administration. It would seem highly probable also that nicotinic acid was essential for the normal activity of the alimentary canal. Possibly pellagra is due to deficiency of more than one nutritional substance. It has been demonstrated that the pain and numbness attending peripheral neuritis in pellagra are not relieved by nicotinic acid, but are promptly alleviated by thiamin chloride. On the other hand, lesions of the mucous membrane, which are cured by nicotinic acid, are unaffected by thiamin. In pellagra, mild mental deviations are quickly alleviated by nicotinic acid, while even severe psychoses are ameliorated. It seems also that recurrences of the disorder are definitely delayed by these compounds. Apparently diethyl amide of nicotinic acid ("Coramine") has properties somewhat similar to those of the substances already indicated.

Spies and his associates consider that pellagra should be viewed as a reaction of the body to lack of essential nutritional substances and not merely as a dermatitis, and that nicotinic acid is one of these, being necessary for the normal functioning of the gastrointestinal canal, the skin, the nervous system and perhaps other organs. Pellagrins suffering from Vincent's infection, mucous colitis, constipation or diarrhœa were relieved of these manifestations by nicotinic acid. Oral administration of the drug is advised when the patient is able to ingest it. When it is given in oral doses of 200 milligrammes or intravenous doses of ten milligrammes, almost invariably and within a minute there is manifest a dilatation of the small vessels of the skin of the face and upper part of the trunk, with rise of temperature, flushing and burning sensations. The activity of the sebaceous glands and the motility of the gastrointestinal tract are increased. The drug has a weak histamine-like reaction.

C. N. Bogart, in an accompanying communication, praises the use of nicotinic acid in severe pellagrous dementia.[1] He considers that this drug will greatly simplify the treatment of pellagra. M. Rachmilewitz and H. I. Glueck have reported in another journal two cases of pellagra in which the patients, while subsisting on a basic pellagra-producing diet, recovered under nicotinic acid treatment.[2]

The conclusions of Spies and his colleagues have not been accepted in their entirety, and much more investigation is essential. Many questions are still unanswered. How does the pharmacological action of nicotinic acid compare with that of nicotine? Does yeast owe its value to an abundant nicotinic acid content?

[1] *The Journal of the American Medical Association*, August 13, 1938.
[2] *The British Medical Journal*, August 13, 1938.

VIVISECTION.

In a small book, "The Truth about Vivisection", Sir Leonard Rogers tears into tatters the arguments of those misguided sentimentalists, the upholders of antivivisection.[1] All who are aware of the findings of two English royal commissions on the subject (those of 1875 and 1906-1912) will recall that at both inquiries the antivivisectionists sustained an overwhelming defeat. These disasters have not silenced them. Since 1912 a sum exceeding £500,000 has been received by various antivivisection societies, which still spend annually tens of thousands of pounds in fruitless attempts to secure the repeal of the Act of 1876, under which animal experimentation has been regulated by the Home Secretary. Meanwhile, some ten million "operations" (without anæsthesia) are performed each year on animals to the end that the English people, including most antivivisectionists, may eat meat. It was on this particular rock that one tender-hearted witness, a clergyman, was wrecked. He stated that he would not have one mouse vivisected to save the greatest of human beings nor the life dearest to him; but he was not a vegetarian, and admitted that he shared in the advantages attained by the unsexing of pigs, rams and bulls.

Sir Leonard Rogers, who is evidently writing for the intelligent layman, points out the debt we owe to animal experimentation for the production of antitoxins and vaccines. The testing and standardization of many drugs, our knowledge of the hormones and our increasing grasp of accessory food factors, all rest firmly on a foundation of facts gleaned from animal research. One by one the infectious diseases of man are being vanquished. The control now exercised over hog cholera, rinderpest, foot and mouth disease, hydrophobia and the puerperal sepsis of cattle should demonstrate to the fair-minded layman that the lower animals have profited as much as man himself by the progress achieved through animal experimentation. Antivivisection, in short, is a bar to the health and comfort of both animal and man. For the sake of both it is unthinkable that properly controlled physiological research will ever be abandoned, or that at a time when the world turns hopefully to scientific medicine for a safer and brighter existence, research students in all countries will be swayed by the false sentiment of a fanatical and illogical cult. Truly has it been said by an American wit that an antivivisectionist is a woman who strains at a guinea-pig and swallows a baby.

[1] "The Truth about Vivisection", by L. Rogers, K.C.S.I., LL.D., M.D., F.R.C.P., F.R.C.S., F.R.S.; 1937. London: J. and A. Churchill Limited. Crown 8vo, pp. 192, with 9 illustrations. Price: 5s. net.

Abstracts from Current Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

The Incidence of Undulant Fever.

ISADORE GERSH AND E. R. MUGRAGE (*The Journal of Laboratory and Clinical Medicine*, June, 1938) have investigated the incidence of positive immunological reactions for undulant fever. Five thousand sera sent for Wassermann testing were examined for agglutinins to *Brucella abortus* by the macroscopic tube method. The results were read after four hours at 54° C. and after forty-eight hours in the refrigerator. In 1·2% agglutination occurred in a 1 in 25 dilution of serum, and in a further small proportion agglutination occurred in a dilution of 1 in 100. In addition, skin tests were performed on 491 unselected hospital patients. The same antigen was used, diluted to 1 in 10. An intradermal injection of 0·1 cubic centimetre was given and the result was read after forty-eight hours. Of these patients, 12·2% gave reactions which were considered positive. The great majority of these patients were living on farms and gave histories of having drunk raw milk. The skin of every patient whose serum had agglutinated *Brucella abortus* cultures reacted to the same antigen, but the serum of many of those whose skins reacted to the antigen caused no agglutination. It is inferred that a positive result to either of these tests indicates a present or past infection with *Brucella abortus*, that this infection is therefore relatively common among these hospital patients, and that its presence is associated with the drinking of raw milk.

Gonococcal Meningitis.

SARA BRANHAM, R. H. MITCHELL AND W. BRAININ (*The Journal of the American Medical Association*, May, 1938) discuss the incidence of gonococcal meningitis and record a case of this disease. The patient was a girl, aged six years, and the infection appeared to be a primary infection of the meninges; vaginal smears taken at the onset contained neither pus cells nor intracellular Gram-negative cocci. The cerebro-spinal fluid was turbid, and Gram-negative cocci were cultured from it on three occasions. The patient was treated with one dose of meningococcal antiserum. She showed a sensitivity to horse serum and was therefore treated only with sulphanilamide. She recovered and was discharged from hospital on the sixteenth day. The organisms in the cerebro-spinal fluid showed the cultural characteristics of the gonococcus. They fermented only dextrose and agglutinated to a titre of 1 in 1,280 with gonococcal antiserum, but only to 1 in 200 with polyvalent meningococcal antiserum, and not with any type sera, though later tests showed a cross-agglutination with type II antiserum. The authors state that of 500 cultures examined and supposed to be meningococcal, ten proved to be gonococcal. In addition to the above tests, use was made of Thompson's alkali solubility test, which shows that the gonococcus is entirely soluble in alkali, the meningococcus not always. The complement fixation test applied to the patient's serum is not always specific for different tribes of *Neisseria gonorrhœæ* and may be misleading. The authors remark that routine laboratory investigations are not always complete and that Gram-negative diplococci coming from the meninges may therefore possibly be described as meningococci when fuller investigation would prove them to be gonococci. They stress the fact that gonococcal infection of either the blood or meninges may arise *de novo* without any history of previous infection of the genital tract.

Convalescent Blood and Immune Adult Blood in the Control of Measles.

CLARENCE M. HYLAND AND LUCILE RUSSELL ANDERSON (*Archives of Pediatrics*, November, 1937) have attempted to review the medical literature of English-speaking countries with regard to the use of convalescent and immune adult blood in the control of measles. Measles ranks high among the acute contagious diseases as a cause of death. It is difficult to prevent exposure to infection from measles because of its highly contagious character during the period of its invasion, when there are no pathognomonic signs by which recognition is made possible. With exposure practically inevitable and with no satisfactory means at hand for the production of active immunity, the control of measles resolves itself into the prevention and modification of the disease through passive immunization. Two preferred agents are now in use for this purpose, namely, convalescent serum, obtained from the blood of patients who have recently recovered from measles, and immune adult serum, obtained from the blood of individuals who have had the disease in childhood or at some remote date. In the majority of cases the injection of convalescent serum into a susceptible person following exposure to measles and during the incubation period will either prevent the disease entirely or produce an attenuated form of it. In many instances the latter result is more desirable, because the immunity resulting from the modified disease is probably permanent, whereas passive immunity is of short duration. Predictions as to the actual outcome in any given case cannot be made, prevention often resulting from the use of serum when attenuation was intended, and *vice versa*. This fact, however, does not detract from the value of measles convalescent and immune adult serum, nor should it restrict its use. Despite all the favourable reports on the use of convalescent serum for the prevention and attenuation of measles, there is still a lack of general interest in the method and, except in large medical centres, its real value is not appreciated. Not only is the use of serum advocated in home contacts, but also its efficiency in aborting epidemics in institutions for children is recognized as being of inestimable value. The usual mode of administration is by the intramuscular route. Although convalescent serum is the preferred prophylactic agent because of its effectiveness in small doses, immune adult serum in proper dosage is also effective and should be more frequently used, especially in places where the use of convalescent serum is not always advisable. The authors recommend a more widespread use of convalescent serum and of immune adult serum.

Virus-Like Bodies in Rheumatism.

G. HARDY EAGLES, P. R. EVANS, J. D. KEITH AND A. G. TIMBRELL FISHER (*The Journal of Pathology and Bacteriology*, May, 1938) have designed experiments to test the infectivity of the virus-like bodies present in the exudates of rheumatic fever and agglutinable by the serum from rheumatic patients. Exudates from early active cases were used, obtained from pleural, pericardial and joint cavities; in one instance a portion of synovial membrane also was used. No attempt was made to concentrate the bodies, but their presence was verified in each exudate by dark-ground illumination. Young *Macacus rhesus* monkeys were used as the test animals. Some were given exudate alone, by the intratracheal, intrapericardial, intrapleural or intravenous route. Some were also given simultaneous injections of hæmolytic streptococci (strain Dochez, N.Y. V) or of preparations of their toxin. In all, 22 animals were used and observed for several months. Electrocardiographic tracings of the heart beat were made at intervals, and *post mortem* examination included histological examination of the heart muscle. A search was made for Aschoff bodies, the presence of which the authors held to be the final proof of rheumatic infection. While some of the animals inoculated with the hæmolytic streptococcus showed toxic changes in the myocardium and collections of small round cells, in no case was there any appearance suggestive of the Aschoff nodule. The authors discuss the difficulty of selecting an appropriate test animal and the likelihood of susceptibility in larger domestic animals which are affected by a disease comparable with rheumatic fever. They give reasons for their selection of the monkey.

They conclude that their experiments show no evidence of infectivity of the virus-like bodies to the rhesus monkey.

HYGIENE.

Vitamin A.

HAZEL E. MUNSELL (*The Journal of the American Medical Association*, July 16, 1938) describes the methods of assay of vitamin *A* and the sources of this vitamin in food. Carotene is converted into vitamin *A* by the animal organism, and carotene has been selected as the international standard of reference; but the best method of assay is still unsettled. There are three proposed methods: (i) the growth method, in which the effect of vitamin *A* on young rats is studied and the rat growth unit determined; (ii) the method of colour tests, in which a blue colour reaction, obtained with antimony trichloride, is used; (iii) the spectrographic method. The green colour of young green leaves of vegetables usually indicates a high vitamin *A* content. The yellow colour of carrots and sweet potatoes, apricots, yellow peaches and yellow tomatoes gives a rough indication of their carotene content. Cereal grains, nuts and legumes are poor in vitamin *A*. Yellow corn has a fairly high vitamin *A* content; and eggs, whole milk and milk products are rich in this vitamin. The colour of the egg is of little value in estimation of its vitamin *A* content. Oxidation or heating of food for long periods diminishes the potency of vitamin *A*; but it is not destroyed by boiling or by canning. Frozen foods retain it, whereas dried or dehydrated foods lose it.

Vitamin A and the Health of Infants.

J. M. LEWIS AND L. H. BARENBERG (*The Journal of the American Medical Association*, April, 1938), in order to obtain information on the margin of safety with respect to vitamin *A* in the average diet of infants, decided to study the progress of a group of infants receiving a diet which contained considerably less vitamin *A* than does the average diet, and to observe simultaneously another group of infants receiving a diet containing an excessive amount of the vitamin. Fifty-one infants were given a diet containing approximately one-fourth the vitamin *A* content of the average diet, and fifty-three infants were given a diet which contained from four to eight times the number of vitamin *A* units in the average diet. These infants were observed for an average period of 6·8 months, and a comparison of the state of nutrition and the incidence of infection in the two groups was made. The results showed that there was no difference as to nutritional state or as to susceptibility to infection between the two groups of infants. The authors conclude that the average diet of infants contains at least four times the minimum requirement of units of vitamin *A*, as judged by the nutritional state of infants and their resistance to infection.

Pathological and Immunological Studies in Poliomyelitis.

MAURICE BRODIE (*American Journal of Public Health*, June, 1938) states that his findings support the theory of the strictly neurotropic character of the poliomyelitis virus and its spread by the nerve tracts. The presence of immune bodies in serum and of resistance are not necessarily correlated, though they usually do correspond in the human being. After recovery antibodies are not as a rule demonstrable. More than one strain of virus exists. Neither the giving of convalescent serum nor any other treatment offers any hope for the prevention or limitation of paralysis. The value of active immunity is still under discussion. Nasal sprays protect monkeys, but probably not human beings. Formolized vaccine (Brodie) may immunize. A susceptibility test to eliminate the naturally immune is needed.

The Immunology of Epidemic Influenza.

THOMAS FRANCIS, JUNIOR, (*The American Journal of Hygiene*, July, 1938) states that an immunity follows infection with epidemic influenza virus. The duration of this immunity is conditioned by the size of the original dose of virus and the severity of the immunity test. It is increased by repeated inoculation. Mice were rendered completely immune to intranasal infection by previous intraperitoneal vaccination with the virus. Retesting, carried out five to eleven months later, showed them to be resistant to many fatal doses of virus. Such time intervals represent a long period in the life span of a mouse. Differences in strains of epidemic influenza virus exist; but although the differences are most pronounced in strains from different epidemics, strains of different antigenic constitution may occur in the same epidemic. Vaccination with one strain may not give complete cross-immunity. It is suggested that the cause for the susceptibility of a certain portion of the population to respiratory disease in general will be found in conditions existing in the respiratory tracts of the persons concerned.

The Course of Trichina Infestation in Guinea-Pigs.

HANS ROTH (*The American Journal of Hygiene*, July, 1938) states that guinea-pigs, like monkeys, can be infested by minimal doses of three or more trichina larvæ. The fact that adult trichinæ can persist in the gut for seven weeks or longer suggests that infestation is just as effective in man, and that much less than fifty trichinæ, the number hitherto regarded as the effective dose, may give rise to a light infestation of muscles. The serial examination of cadavers in the United States of America has revealed an incidence of 20% in the adult population. Most of these infestations are undiagnosed during life. Whereas in guinea-pigs Roth counted 20,000 trichinæ per gramme of muscle, in the human diaphragm usually less than ten are found per gramme. Roth considers that the number of embryos encysted in muscle is about 1,000 to 2,500 per female adult. Live trichinæ are found in 1% to 2% of swine in the United States of America, and perhaps many more swine are lightly infested. This suggests that widespread undiagnosed trichinosis in man may be due to the consumption of improperly cooked or processed pork or pork products in which a few trichinæ have survived cooking, or of raw pork from highly infested swine.

Investigation of Early Syphilis.

W. T. CLARK AND CLEALAND A. SARGENT (*American Journal of Public Health*, July, 1938) have made an attempt to trace the history of infection of and the dissemination of infection from patients with primary, secondary or early latent syphilis. The cases investigated were those occurring in Buffalo during a period of 25 months. Of 488 "initial" cases, genital lesions were found in 464; 48% of these were primary and 39% secondary lesions. Information was obtained in 86% of 431 cases in which it was sought. In 55% the person from whom the infection was derived was unknown; but in 14% of cases the source of infection was found, and in 5% of these the infection was marital. With regard to the dissemination of infection from these "initial" cases, in 30% the patients had had subsequent contacts and in 19% the contacts could be traced. Of 57 persons thus shown to have been exposed to infection, 43, or 75%, contracted the disease. This investigation shows the importance and the difficulties of this method of following up chains of infection. Altogether 52 new and untreated patients were brought to light.

Association of Trichomonas Vaginalis Vaginitis and Leucorrhœa.

JUSTIN ANDREWS (*The American Journal of Hygiene*, July, 1938) has examined vaginal discharges from 84 white and 155 negro women. *Trichomonas vaginalis* was found to be present in 50% of negro women and in 18% of white women. Vaginitis and leucorrhœa occurred in somewhat similar percentages. The coexistence of leucorrhœa and *Trichomonas vaginalis* infection was no greater than might be expected from chance alone; but there was some evidence of the association of vaginitis with the presence of *Trichomonas vaginalis*.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on July 16, 1938, at the Wangaratta District Base Hospital, DR. J. P. MAJOR, the President, in the chair. The meeting took the form of a series of clinical demonstrations by members of the honorary medical staff of the hospital.

Diabetes Mellitus.

DR. VERNON DAVIES showed three young men whom he was treating for *diabetes mellitus*. He wished to provoke discussion on the value of a high carbohydrate diet and of treatment with protamine zinc insulin, as well as on the desirability of ascertaining the absence of known diabetes in the family of the partner to a proposed marriage with a diabetic and the place in the national insurance scheme for diabetics falling within the income limit provisions of the Act.

One of the young men, aged twenty-one years, had suffered from boils in 1932, but had been found to have glycosuria in May, 1937, during an examination for admission to a friendly society. The glycosuria had cleared up after three weeks and the doctor had passed him for admission to the lodge benefits. During the next six months the patient had lost 6·4 kilograms (one stone) in weight and had manifested excessive thirst, nocturnal micturition and lassitude. The patient's father had glycosuria and had complained of pains in the arms and legs. He was a beekeeper, aged forty-six years, who weighed 82·6 kilograms (thirteen stone) and was 160 centimetres (five feet four inches) in height. One of the remaining four members of the family also had glycosuria.

The patient was found to have a diabetic type of sugar tolerance curve, and a fasting blood sugar content of 0·13%. He was receiving a full diet estimated at an energy value of 2,000 Calories. He was given a daily injection of ten units of insulin in the morning and was able to carry out heavy work in the scrub.

Another man, aged twenty-two years, had come under notice in June, 1937. He had had diabetes of two months' duration, during which period he had lost 6·4 kilograms (one stone) in weight. He had been treated by means of insulin and restricted dietary for fourteen months. In September, 1937, on the advice of Dr. Ewen Downie, at the Alfred Hospital, treatment with protamine zinc insulin had been commenced. In January, 1938, the amount of exercise to which he was accustomed was restricted on account of a badly infected toe. A relapse of the diabetes had occurred. The patient was a clerk studying accountancy. He weighed 65·3 kilograms (ten stone four pounds). He had remained well on a diet with an energy value of 1,900 Calories while receiving each day forty units of protamine zinc insulin and ten units of ordinary insulin. Dr. Davies remarked that he had found it necessary to alter the amount of insulin and the dietary of patients in the area in which he practised on account of the extreme variation in the climatic conditions in summer and in winter.

The other patient, aged twenty-two years, had suffered from severe diabetes from the age of twelve years. He required two injections per day, each of forty units of ordinary insulin. The fasting blood sugar content had been as high as 0·272% and the patient had had several hypoglycæmic attacks. Dr. Davies remembered that on one occasion he had seen the patient in a semi-comatose state after a fit, and he had responded to the treatment for hypoglycæmia. At the time of the meeting, the patient was receiving a diet with an energy value varying between 1,500 and 1,700 Calories. He had two injections of insulin each day, each of thirty-five units.

Dr. Davies remarked that if the patient indulged in heavy exercise he was likely to have hypoglycæmic attacks, and that it was difficult to decide how much insulin it was safe to give him.

DR. ERIC COOPER said that he considered that young men who were still growing and doing heavy manual work required a diet with a caloric value of about 2,400 or more, even if it was necessary to increase the amount of insulin. It was important to avoid the development of tuberculosis, which was a great danger in diabetics under thirty years of age. He had been interested in Dr. Davies's observation that the hot summer allowed of less exertion and more insulin was required on that account. In Melbourne the patients required less insulin in summer-time, usually because they were more out of doors and exposed to the heat on the beaches. The third of Dr. Davies's patients presented a real problem. He was difficult to stabilize on original insulin, and would prove equally difficult on protamine zinc insulin. Dr. Cooper recommended that the diet should be increased, to allow a larger margin of safety, and that the insulin should be given a longer time before meals. With those alterations he thought that the patient would be less likely to have hypoglycæmic attacks.

DR. LESLIE HURLEY referred to a recent publication by Joslin. He stated that it was easier to stabilize young subjects with protamine zinc insulin alone or in combination with original insulin. There was a more uniform regulation of the blood sugar content. It was advisable to have the patient in hospital for at least a week for the purpose of stabilization. The juvenile patients were hypersensitive and liable to become hypoglycæmic on protamine zinc insulin. When the amount of insulin required to overcome the elevation of the blood sugar content and the glycosuria had been ascertained it was a good idea to keep the amount of insulin constant, to give the patient more exercise and to increase the diet liberally. Patients at the age of seven years required three grammes of protein per kilogram of body wight; at sixteen years they required two grammes, and at twenty-one years one gramme per kilogram.

DR. C. H. DICKSON said that under national health insurance all employed persons with an income under £365 *per annum*, and all persons in manual employment, would be insured persons. The scope of service would not, however, include services not customarily undertaken by general practitioners, and the treatment of *diabetes mellitus* was likely to be excluded from the scope of service.

Osteomyelitis.

DR. J. J. KELLY showed a series of patients with inflammatory diseases of bone. One was a schoolboy with osteomyelitis of the neck of the scapula. In December, 1936, while delivering newspapers at night-time, he had fallen off his bicycle against an open gate and had injured the upper portion of the arm. Shortly afterwards his temperature had risen to 39·2° C. (102·6° F.) and the pulse rate had become rapid. Dr. Kelly had found a swelling over the upper portion of the humerus extending into the axilla. At first he thought that the boy had torn a muscle and had an infected hæmatoma, but later the infective trouble had been found to involve the neck of the scapula. Extensive destruction of the neck of the scapula had followed, and the lesion had been kept under observation and had been treated conservatively. A series of skiagrams had been made. In March, 1938, a large quantity of pus had been aspirated from a swelling behind the shoulder. The shoulder joint had been put at rest and the general condition of the patient built up. A course of injections of staphylococcal vaccine had been given, and the patient had made a slow recovery.

In spite of the fact that the glenoid cavity had been completely destroyed, the boy had obtained employment after leaving school and had a fairly useful arm except for limitation of movement at the shoulder joint. The loss of function had been assessed at not more than 15% of the use of the arm. Dr. Kelly had thought that a 33% disability of the arm was more accurate, and the final decision had been made that the disability amounted to 25% of the use of the arm. Dr. Kelly added that the lad had had an hæmoptysis while staying in Melbourne. This had not yet been thoroughly investigated.

DR. E. E. PRICE, with reference to osteomyelitis, said that he had succeeded in achieving a cure with new bone formation following destructive arthritis. He regarded the

ætiology in Dr. Kelly's case as being probably coccal infection, the other possibility being tuberculous disease. He remarked that in the assessment of disability in the arm more than 50% of the use of the upper limb was generally taken to reside in the hand. He expressed the opinion that the patient might get better function if the arm was abducted on an abduction splint when he was not working.

DR. BRYAN KEON-COHEN said that he did not think the diagnosis of tuberculous disease could be excluded. The appearances in the skiagrams were not incompatible with healed tuberculous disease. If the chest lesion proved to be tuberculous it seemed probable that the shoulder lesion was also tuberculous. In that case the disability might be greater, on account of the likelihood of a recrudescence of activity in the lesion.

Another of Dr. Kelly's patients was an Englishman, aged twenty-seven years, who, in 1930, while convalescing from typhoid fever, had complained of sacro-iliac pain and had become feverish again. A little later evidence of sacro-iliac osteomyelitis had been found in a skiagram. From time to time the lesion had caused further trouble, though it had not greatly upset the patient. Fifteen months after the onset he had had an abscess in the groin. Dr. Victor Hurley had advised conservative treatment. The patient had remained in reasonably good health and had gone on with his work on a tobacco plantation. Dr. Kelly had intended to inject the sinus with iodized oil in order to demonstrate its extent at the meeting, but he had found that the sinus had closed. The sacro-iliac synchondrosis had been replaced by new bone, and there was only the small scar left where the sinus had been. Bacteriological examination had resulted in the culture of staphylococci, but Dr. Kelly wondered whether the case was an example of typhoid bone infection.

DR. W. A. HAILES said that typhoid disease of bone was uncommon nowadays. All he had seen had been suppurative; and as the lesion in Dr. Kelly's case had healed, he would take it to be of coccal origin. Typhoid infection of the spine or sacro-iliac region was referred to as typhoid disease of bone. Typhoid infection of joints did not lead to suppuration. It caused an acute infective non-suppurative arthritis. In his experience, however, typhoid disease of bones caused suppuration.

Osteitis.

Dr. Kelly also showed a young man with osteitis of the fifth lumbar vertebra. The history was that some time earlier he had been operated on in another hospital for acute appendicitis. During convalescence his temperature had suddenly risen, and the surgeon had probed the wound. A purulent discharge later had come from it. A subphrenic abscess had followed. The patient had been admitted to the Wangaratta Hospital; he was very ill, with an abscess on the dome of the liver. The collection had later been drained through the ribs and the boy had recovered. He had been working harder than Dr. Kelly liked until, three weeks before the meeting, while cranking a car in the rain, he had suddenly felt pain in the right sacro-iliac region. Two days afterwards the pain was severe and cramp-like if he rolled over in bed, and there was a tendency for it to go down the right leg. If he remained quiet he was free from pain; but his temperature was 37·8° C. (100° F.) and the pulse rate was 120 beats per minute. Ten days after the onset of pain the appearances of the sacro-iliac region in a skiagram were not abnormal. He had continued to be miserable, unable to sleep or eat properly, and with a mild pyrexia, so another skiagram was prepared a week after the first one. This showed the appearances consistent with the diagnosis of osteitis of the fifth lumbar vertebra. For two or three days before the meeting the patient's general condition had been satisfactory. He still had numbness between the knee and ankle, and foot-drop, which Dr. Kelly was supporting by a plaster. Dr. Kelly asked for advice about splinting and as to whether there was any association between the spinal focus and the appendicitis and subphrenic abscess.

DR. E. E. PRICE thought that there was room for discussion as to whether the upper border of the fifth lumbar vertebra was eroded. He was inclined to regard the condition as being infective and non-tuberculous, and suggested that another skiagram should be prepared after the bowel had been emptied by means of an enema. He recommended fixation of the limb and back on a plaster bed until the healing of the focus was well consolidated, perhaps for as long as six months or a year.

Multiple Diaphyseal Aclasis.

DR. KELLY also showed a small boy who had been one week in hospital with a large, hard tumour, palpable at the upper end of the left humerus. He had been complaining of pain in the left arm for approximately six months. Dr. Kelly invited comment on the diagnosis and treatment.

DR. E. E. PRICE said that the condition was multiple diaphyseal aclasis of the type which used to be known as Ollier's disease. It was a disordered bone growth of unknown origin. Ollier had first described the way in which it was likely to cause curving of the diaphysis and slight but constant deformities of the hand. Later case reports had shown that Ollier's dyschondroplasia was only an example of a more general disturbance of the normal architecture of the diaphyses. Only exostoses that prevented the proper functioning of joints should be removed surgically.

Pernicious Anæmia.

DR. J. N. SHELTON showed three patients who had been under treatment for pernicious anæmia. A woman, aged thirty years, had made a gratifying response to a course of injections of "Campolon". A man, aged fifty-eight years, found that it was imperative for him to take dilute hydrochloric acid to avoid violent abdominal pain. He was also undergoing treatment with "Campolon". The remaining patient was a man, aged twenty-eight years, who had made a remarkable response to treatment with "Campolon" and raw hog's stomach cut up finely. He was taking 30 grammes (one ounce) per day of this camouflaged in sardines and "Marmite". The number of erythrocytes had been down to 900,000 per cubic millimetre and the hæmoglobin value to 25% in May, 1938. At the time of the meeting the erythrocytes numbered more than three million per cubic millimetre and the hæmoglobin value had risen to 60%.

DR. S. O. COWEN said that when pernicious anæmia was complicated by subacute combined degeneration, as in the case of Dr. Shelton's first patient, it was advisable to give large dosage of "Campolon" and to keep the erythrocyte figure and hæmoglobin value high. The girl might be safer if the dosage of "Campolon" was increased. Dr. Cowen remarked that preparations of hog's stomach were of questionable value. He had not yet seen anything to prove that any stomach preparation was more efficient than properly administered liver. He added that in his opinion "Campolon" possessed certain advantages over other highly concentrated extracts in minimizing neurological complications.

DR. LESLIE HURLEY also questioned the value of freshly prepared hog's stomach. He stated that he had used desiccated stomach preparations and had gathered the impression that if large amounts of liver were given combined with some of the stomach preparations improvement was faster. It had been his practice to administer injections of five cubic centimetres of "Campolon" every second week, and to advise the patient to take cooked fresh liver and a dried stomach preparation during the interval between injections, as well as a reliable preparation of vitamin *B* and a good liberal dietary.

Dr. Hurley expressed the opinion that the last patient shown by Dr. Shelton was very young to have pernicious anæmia, and had not the characteristic bodily appearance. He also stated that patients with macrocytic anæmia sometimes gave a gratifying response to liver treatment, even in the presence of carcinoma of the stomach. He thought that the patient shown might have been losing blood by the bowel, as the history was suggestive of the presence of a gastric or duodenal ulcer. It was possible for the clinical picture to resemble that of macrocytic anæmia as the result of loss of blood. Examination after a test meal might reveal the presence of hydrochloric acid in the

stomach contents. This was a rare finding in pernicious anæmia.

DR. ERIC COOPER agreed with Dr. Hurley that the diagnosis was in doubt in the case of the patient shown last by Dr. Shelton. The patient had two brothers who were much bigger than he. He had a delicate skin with fine hair, and passed an excessive amount of urine. Dr. Cooper had formed the impression that the macrocytic anæmia might be secondary to a glandular dystrophy affecting perhaps the pituitary gland. Before a definite conclusion could be reached further investigation was required.

DR. G. A. PENINGTON also thought that Dr. Shelton should try to determine the cause of the rectal bleeding in the case under discussion. Another point in connexion with the blood examination was the presence of a large number of polychromasic and punctate basophilic cells. That evidence of regeneration made it unlikely that the disorder was a primary anæmia. He suggested sigmoidoscopic examination as well as a test meal. He added that if achlorhydria was found, 2·5 grammes of histamine should be injected to see if this procedure resulted in the production of any free hydrochloric acid.

Fractures.

DR. N. P. LONG, on behalf of Dr. D. D. Browne, showed a series of patients. One was a man, aged eighty-four years, who had sustained an oblique fracture of the shaft of the femur when he had slipped on the kitchen floor on April 23, 1938. The fracture extended from 5·0 centimetres (two inches) below the lesser trochanter to the region of the greater trochanter, with some displacement of the upper fragment inwards and 5·0 centimetres (two inches) of shortening. The limb lay rotated outwards. He had rapidly become comfortable with the limb in extension on a Hamilton Russell frame, only 2·7 kilograms (six pounds) of weight being used. The outward rotation corrected itself automatically; the shortening had been overcome in two days, and the patient was able to enjoy considerable freedom of movement and to turn without any pain at the site of the fracture. By July 1 union seemed to be firm. Despite some lack of alignment visible in skiagrams, a good functional result was anticipated.

Dr. Browne had had a somewhat similar experience in caring for an old lady in 1920. In that case twenty-three pounds' weight of extension and a Thomas's hip splint had been used unsuccessfully in another town. The damage done had been overcome by the use of Russell's frame with only six pounds' weight and a mere collar of plaster to curb the free mobility at the site of the fracture. Dr. Browne had asked Dr. Long to point out that those two cases illustrated the fact that, provided a limb was placed in a comfortable position and in a state of equilibrium, the organism as a whole much preferred movement to take place at a joint rather than at the site of a fracture.

The next patient shown by Dr. Long was a man, aged thirty years, who had fallen on his outstretched left hand while playing football on May 21, 1938. His elbow had become somewhat stiff and swollen, but Dr. Browne had not seen him until two weeks had elapsed. By then there was very little swelling, but some tenderness was present on pressure in the flexure of the joint. Movement was limited to a right angle of flexion and extension was limited by a few degrees. In the skiagram it appeared that the tip of the coronoid process of the ulna had been torn off.

DR. W. A. HAILES thought that the fragment might be from the head or neck of the radius. He suggested that further skiagrams should be prepared at varying oblique angles. It was probable that if the fragment was taken out the movements at the elbow joint would improve.

DR. BRYAN KEON-COHEN thought that it would be worth while waiting a further month before operating, since considerable movement at the elbow joint might be obtained by suitable treatment.

DR. J. J. KELLY showed a male patient with an ununited fracture of the tibia. Seventeen months earlier he had sustained a compound fracture of the tibia and fibula of the right leg. The patient had been in the Alfred Hospital, and had come to Wangaratta to be cared for by a relative. Dr. Kelly had had to take the plaster of Paris splint off because the leg had become so unhealthy. He had placed the limb in a plaster case and he had cleansed the wound, periodically exposing it to the fresh air and giving it mild ultra-violet ray treatment. A piece of dead tibia had protruded from the wound; he had loosened and removed it. He sought advice from the surgeons present at the meeting as to what was the best thing to do next.

DR. KEON-COHEN stated that amputation was to be avoided if possible, and suggested that Dr. Kelly should get the patient up in a Thomas's calliper splint with a guarding plaster to maintain some immobility. It might be as long as two years before the wound would be ready for bone grafting.

DR. C. J. O. BROWN said that if Dr. Kelly got the patient up the leg would swell. Before any attempt was made the flexion contracture of the foot should be improved and another plaster stocking applied. He advised that after that improvement in the foot had been brought about the patient should be allowed up, wearing a walking plaster of the Böhler type.

Solitary Exostosis.

Dr. Long also showed a girl, aged fourteen years, said to be of subnormal mentality, who had come to the hospital on May 27, 1938, because of inability to lift objects with the left hand. She stated that she had fallen when climbing through a wire fence five weeks earlier, pulling the left arm straight and twisting it outwards. A small, firm, projecting mass was felt, attached to the upper part of the internal surface of the humerus. It was tender only on firm grasping and pushing. It was left alone and function had improved rapidly. In a fortnight the patient had been able to lift a couple of heavy books from the floor without difficulty.

DR. E. E. PRICE said that the condition was an example of solitary exostosis which was of interest in contrast to the other patient shown that afternoon with multiple exostoses. An ossifying chondroma was growing towards the upper end of the humerus. The coracoid process of the scapula could be identified apart from the chondroma.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

Anderson, Bruce Hunter, M.B., B.S., 1936 (Univ. Melbourne), c.o. Australia House, Strand, London.
Mirams, Marjorie, M.B., B.S., 1936 (Univ. Melbourne), Queen Victoria Hospital, Mint Place, Melbourne, C.1.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on July 13, 1938, at the Children's Hospital, Carlton, DR. COLIN MACDONALD in the chair.

Tumour of the Neck of the Femur.

DR. WILFRED FORSTER showed a female patient, aged fourteen years, whom he had under treatment for a tumour of the neck of the femur. In 1925 the child had undergone treatment for congenital dislocation of the hip joint. Latterly she had come under his care because of the bone lesion, which had collapsed on the surface like "eggshell crackling". He had curetted it, and after removing a biopsy specimen for Dr. Reginald Webster he had cauterized the wound with a strong solution of carbolic

acid and closed it around a drainage tube. The wound had healed by first intention, and the girl had worn a patten for two months. She still had a slight limp at the time of the meeting.

In his report Dr. Webster had indicated that the giant cells present were suggestive of a chronic inflammatory process. There was not in the distribution of the giant cells the homogeneity characteristic of myeloid sarcoma.

Dr. Forster had found no pus in the tumour, and asked for ideas concerning the diagnosis. The main possibilities that had to be considered were solitary cyst of the bone, myeloid sarcoma and fibrocystic disease. He understood that radiologists could identify in skiagrams the appearances characteristic of fibrocystic disease associated with a parathyreoid tumour. Accuracy of diagnosis was of importance, on account of its bearing on the prognosis.

From the clinical point of view he regarded the condition as benign giant-celled sarcoma. His object in showing the patient and the skiagrams was to stimulate a discussion concerning the pathology of the condition to which he hoped Dr. Webster and Dr. Colin Macdonald would contribute. They had each had an opportunity to supply reports from two different types of observations. Dr. Forster wondered how Dr. Webster separated the various pathological conditions entering into the differential diagnosis in the type of case under consideration, and also to what extent Dr. Macdonald could be helpful by interpretation of the radiographic appearances.

DR. REGINALD WEBSTER said that he was aware that his pathological report was at variance with the clinical diagnosis of benign giant-celled sarcoma. From the description of the clinical features furnished by Dr. Forster, and from the skiagrams that had been shown, he could well understand the clinical diagnosis. He had been himself surprised when he found that he was unable to interpret the features of the microscopic section as unequivocally those of a benign giant-celled sarcoma.

He had always considered the microscopic features of myeloid sarcoma so distinctive as to make histological diagnosis comparatively simple in a sphere in which the pathologist met many difficult problems, to wit, that of bone pathology. His conception of the benign giant-celled tumour as seen in a microscopic section was that of large numbers of giant cells set in a homogeneous background of connective-tissue cells, oval or spindle shaped, without the hyperchromatic quality and active mitoses of malignant cells.

An essential condition to the diagnosis of myeloid sarcoma was that giant cells should be numerous. Occasional giant cells were of no particular significance, and were to be seen in almost any chronic inflammatory condition of bone and in frankly malignant tumours. Those present who had received their early instruction in pathology from the late Sir Harry Allen might remember that he used to insist that the histological diagnosis of myeloid sarcoma was justified only when giant cells numbered approximately one-third of the number of cells in the field.

Dr. Webster said that in the study of the sections he had prepared from the material submitted by Dr. Forster two considerations had led him to report in terms which did not support the clinical diagnosis of benign giant-celled sarcoma. In the first place he did not regard the number of giant cells as sufficiently great, and further, there was not in the cells comprising the general substrate of the section the homogeneity to which he had already referred. Giant cells were certainly present; but in many fields, in fact in the majority, there was none. Instead of the uniformly oval-shaped connective-tissue cell, there occurred a variety of reactive cells in which round cells, endothelial cells and polymorphonuclear leucocytes were conspicuous. There were, indeed, many areas in the microscopic fields in which polymorphonuclear leucocytes were so prominent in the granulomatous picture that the condition appeared to have narrowly escaped frank suppuration.

Having reexamined the sections in view of the presentation of the patient at the meeting, Dr. Webster felt that he could not do other than affirm his previously expressed opinion, that the lesion was of the nature of chronic osteomyelitis.

Dr. Webster went on to say that he was afraid that in the diagnosis of bony lesions discrepancies between the radiological and pathological views were bound to arise. The pathologist had an advantage over the radiologist. He could examine the individual cell components of the tissue in question, their general disposition and architecture, while the radiologist was limited to a silhouette of the macroscopic lesion. At the same time those present would do well to remember the pitfalls in biopsy, and not to expect a superhuman infallibility from the pathologist. In the removal of a piece of tissue for biopsy an atypical piece might be taken, or one that was profoundly altered by inflammatory or degenerative changes. That was particularly true of bony lesions presenting cystic appearances radiologically; for the mere presence of radiolucent areas was often the result of some type of degenerative change. In the multitude of counsellors there was wisdom, and it was essential to give due weight to the carefully considered opinion of the clinician, the view of the experienced radiologist, and the supplementary evidence adduced by the pathologist. The pathologist who ignored clinical data worked with an entirely wrong outlook; and so eminent an authority as Ewing had said that the more experienced the pathologist, the more he urged the surgeon to make his diagnosis on clinical observation and not to expect too much from the study of small pieces of tissue.

DR. BARBARA WOOD said that there were evidences in the skiagrams of bone expansion without bone production, which was an uncommon combination in an inflammatory process. She thought it unlikely that the tumour was a simple bone cyst, because of the radiographic evidence of loculation, and because the cyst was so high up in the femur. She interpreted the appearances as suggesting the presence of a tumour of the myeloid sarcoma class.

DR. E. R. TRETHEWIE ascribed to Schmidt the idea that benign giant-celled tumour was the end-result of the presence of blood in a simple cyst, which was apt to undergo chronic inflammatory changes and ultimately to become a benign giant-celled tumour.

DR. H. DOUGLAS STEPHENS said that he had a few years earlier had a patient with a similar lesion, and the same confusion respecting diagnosis had occurred. The cyst had contained clear, gelatinous fluid. At operation he had pushed the bone in and closed the wound. The site had afterwards been subjected to deep X ray therapy. The patient had made a good recovery, and had not had any further trouble up to the time of the meeting.

DR. COLIN MACDONALD said that Dr. Webster's scriptural allusion had made him think of another. He was inclined to remember to "agree with thine adversary quickly while in the way of him". Both he and Dr. Webster were seekers after truth. Dr. Macdonald was of the opinion that microscopic appearances should never be interpreted by the shadows on the skiagram. It was his habit to express his opinions by stating that the appearances suggested such-and-such a condition. With due regard to the limitations of Röntgenography, it was amazing that radiologists were so often correct.

Pseudo-Hypertrophic Muscular Paralysis.

DR. H. BOYD GRAHAM showed a boy, aged four years and eight months, suffering from pseudo-hypertrophic muscular paralysis. The child's mother had been married twice and was only thirty years of age at the time of the meeting. A girl, aged eight years, the only child of the first marriage, was quite healthy. The patient shown by Dr. Graham was the only child of the second marriage. The father had left home before the patient was born, and the mother was unable to give any medical account of the paternal relatives. The mother had three brothers and one sister, and none of them had had any muscular or nervous disability. The mother had had rheumatic fever at the age of seventeen years, and had subsequently developed mild chorea, but appeared to have recovered satisfactorily.

Dr. Graham said that the child had attended the out-patient department at the Children's Hospital at the age of fifteen months, and was passed medically as suitable

for admission to a babies' home. He did not, however, go to the home. At the age of twenty months he attended again, because he was making very poor attempts at walking, though he could stand alone. The mother drew attention to the fact that he was very restless in bed, and even when apparently asleep spent most of the night paddling with his legs and twisting onto his stomach and side. Dr. Graham had examined him at that time and had not regarded him as defective physically or mentally. He weighed only 9·5 kilograms (twenty-one pounds). A little thyreoid extract and phenobarbital were prescribed, and directions for general management and diet were given. The mother was asked to bring him for observation at least every three months, but she did not do so. At the age of two years he weighed 10·4 kilograms (twenty-three pounds), had eighteen teeth and could walk with support, but not alone. He appeared to be of normal mentality. It was not recognized that he had any muscular dystrophy.

The child did not return to the hospital until April, 1938, when he was referred to Dr. John Williams for psychiatric investigation without being seen by Dr. Graham. The intelligence quotient was estimated at 85%. He was reported to show interest, judgement and good reasoning capacity, but displayed slowness of thought and of movement. Dr. Williams had expressed the opinion that the condition was pseudo-hypertrophic muscular paralysis. The child returned to Dr. Graham's clinic, and he confirmed the diagnosis. The mother stated that the child had walked alone at the age of three years and one month. He was in the habit of taking an unnaturally long time to get up, and seemed flat-footed, especially on the right side. He was an extremely nervous child, who went white to the lips if he was frightened. The mother had also noticed that the calves, particularly the right, became swollen at times. Her attention had first been drawn to that feature at the time when he first walked alone. He had also had red, blotchy marks on the legs below the knee, but on no other part of the body. She had consulted a chemist about it, and he had told her that the sweat glands were not working properly.

Dr. Graham said that he had presented the child because some years had passed since there had been a discussion on the subject at a meeting of the Melbourne Pædiatric Society. He remarked on the detection of the enlargement of the calves by the child's mother when he was three years old. The condition should be borne in mind by physicians, surgeons and orthopædists alike, who were apt to be consulted on account of lateness in walking. The patient demonstrated in the classical manner the peculiar method of rising by "climbing up himself".

DR. GRAEME ROBERTSON said that the use of glycine in the treatment of pseudo-hypertrophic muscular paralysis was based on a fallacy. It was not surprising, therefore, that the results of its use had been disappointing. Creatine was combined with phosphoric acid in muscle, and as a result of metabolism in muscle creatinine was excreted in the urine. In the urine of an adult person there was no creatine, but a constant amount of creatinine in normal circumstances. In the urine of patients with the disorder under discussion there was an excretion of creatine. If glycine was given, there was an increase in creatine and not in creatinine; glycine was transformed into creatine and excreted as such. Only if the creatinine was increased would there be an indication of improvement in muscular metabolism. A similar state of affairs was found in other conditions associated with muscular wasting. Nevin had pointed out that the administration of glycine could be looked on as a means of performing a creatine tolerance test. Dr. Robertson added that there was no abnormality in the creatine of the blood in the disease. There was some clinical evidence that patients with Erb's type of muscular dystrophy derived slight benefit from glycine treatment.

DR. F. KINGSLEY NORRIS referred to a book by John Oxenham, which was a diary of a family containing a number of patients with pseudo-hypertrophic muscular dystrophy. It was pitiable to realize that those people had all their faculties, but lost opportunities to train them and to use them and became seriously invalided. Dr. Norris had used glycine for three of his patients over extended periods, but had had no success with it and had given up using it. He also remarked that in the case under discussion no other members of the family had been affected. In his experience that was the rule rather than the exception.

DR. R. R. WETTENHALL said that the statements appearing in text-books concerning the family incidence of certain conditions might in some cases be affected by the fact that the statements were based on the family histories in districts in the Old World where considerable intermarriage had occurred.

DR. H. DOUGLAS STEPHENS said that he could recall an instance at Carlton in which five brothers had all attended at various times at the Children's Hospital with pseudo-hypertrophic muscular dystrophy. He remembered that one member of that family had died at the age of twenty-five years.

DR. W. W. MCLAREN referred to a family of three brothers suffering from the disease, and who were under his care.

DR. A. P. DERHAM said that a patient, aged eleven years, had been admitted to the hospital under his care that week. No other member of the family was affected. With reference to the incidence of the condition, he thought that about 1 in 1,000 of the children examined for the Legacy Club had the disease. He also thought that some primary mental deficiency went *pari passu* with the more obvious muscular deterioration.

DR. J. W. GRIEVE said that he was inclined to support what Dr. Norris had observed about the family history.

Cretinism.

DR. J. W. GRIEVE showed a female baby, aged nine months. She was the fourth of four children and had weighed 3·2 kilograms (seven pounds two ounces) at birth. She was a full-time baby, but she had been cyanosed at birth, and mouth-to-mouth resuscitation had been required in addition to the use of "Carbogen" gas. At the age of five days the baby had become extremely cyanosed and œdematous from the umbilicus downwards. The cyanosis disappeared when "Carbogen" was given through an intranasal catheter, and the œdema subsided in a few weeks. It had been difficult to feed her, as she took food very slowly and in small amounts. Natural feeding had been continued for a few days only. The food used was "Vi-Lactogen". She had recently been having six feedings a day, each consisting of 90 cubic centimetres (three ounces) of the solution; but it took as long as one and a half hours to give her one feeding. She had been constipated throughout life and had been given an aperient each day.

Dr. Grieve said that the mother had noticed that the baby had always been apathetic and would not kick or move about in the normal manner. The baby had a hoarse cry and a large tongue. She snuffled and was inclined to lose her breath readily. The skin was dry and always cold, even on the hottest night. There was a tendency to the formation of scaly patches on the skin, and the hair was dry and lumpy. The mother and father and the other three children were healthy. The mother was forty years of age and did not suffer from hypothyreoidism.

When Dr. Grieve had examined the baby on June 28, 1938, the weight was only 4·9 kilograms (eleven pounds) and the length 56·3 centimetres (twenty-two and a half inches). This was 12·5 centimetres (five inches) under the expected length. The head circumference was 39·4 centimetres (fifteen and three-quarter inches). The face was pale, puffy and yellowish, with coarse features and wrinkled forehead. The tongue was large, and the baby had a nasal discharge and snuffles. The skin was dry, and pads of fat were present over the supraclavicular areas, the back of the neck and shoulders, the axillæ and the anterior aspect of the legs. The hands were large, with square fingers, and the hair was dry and sparse. In

the abdomen, which was large, fæcal masses were palpable and the baby had an umbilical hernia. The bones of the skeleton were small, the fontanelle was unduly open and no teeth had erupted. Though the heart was not enlarged, a soft systolic bruit was audible. The thyreoid gland could not be felt. Investigation of the blood revealed the presence of severe anæmia. The hæmoglobin value was estimated to be 38% (Sahli); the erythrocytes numbered 1,960,000 and the leucocytes 23,000 per cubic millimetre. In the blood film diffuse and punctate basophilia, anisocytosis and poikilocytosis were revealed, and a few normoblasts were seen. The blood cholesterol content amounted to 230 milligrammes per 100 cubic centimetres and the alkali reserve was estimated at 46%. Characteristic retardation of bone development was established radiographically. The bone age was less than that of the average baby at birth.

Dr. Grieve said that the mental age of the baby at the time of admission to hospital was less than two months, and that at first it had been difficult to keep the temperature normal. The baby had been receiving thyreoid gland tablets (Commonwealth Serum Laboratories), the dosage being 0·016 gramme (one-quarter of a grain) twice a day. The food used was a sweetened milk mixture consisting of three parts of milk to one part of water. In the early stages, as the baby would not suck properly, food had been administered by the intranasal route. It had been difficult to give the baby sufficient food at that time, but by the time of the meeting the baby was receiving adequate food, mainly by the intranasal route, but partially from a bottle in the normal manner. The weight had increased slowly to 5·4 kilograms (twelve pounds). The child had improved in appearance, the tongue was relatively smaller, the skin was clearer and she was taking more interest in the surroundings.

DR. J. K. GABRIEL opened the discussion with an epitome of the history of the subject of cretinism. Wolfgang Hoefer, born in 1614, at Freising, in Bavaria, the son of a professor of medicine at the University of Ingolstadt, had written only one book, *"Hercules Medicus"*, published at Vienna in 1657. That book contained a noteworthy account of cretinism.

Dr. Gabriel quoted the following translation of an extract from the book:

> Though feeble-mindedness be indeed so common to many people in the Alps, and endemic, some ascribe it to the air, others to the water, and others to the food and upbringing. Beware that thou believest the first not the second, since the drinking of waters are most healthy, and still the foolish are as numerous as possible, therefore the third, *i.e.*, food; these people are delighted with foods giving much excrement and little nourishment and offended by the opposite, therefore more voracious and never satisfied save with an abdomen straining to the bursting point.

Dr. Gabriel went on to mention the description of hyperthyreoidism, or exophthalmic goitre, by Parry (1786), Graves (1835) and Basedow (1840), and of hypothyreoidism, or myxœdema, by Curling (1850), Gull (1875) and Ord (1877).

Thomas Blizard Curling, F.R.S., of the London Hospital, 1850, had described an infant aged six months. The child was plump, with an idiotic expression, a large tongue protruding from the mouth and swellings at the side of the neck. Its lower limbs were helpless. At autopsy small cerebral hemispheres were seen, but no thyreoid gland was found. He had thought that the development of the neck swellings was due to a deficiency in the thyreoid, and suggested research.

Dr. Gabriel also emphasized the mysterious importance of the thyreoid gland, which was excised with fatal results from the dog by the Geneva physiologist Moritz Schiff, in 1856. Reverdin, of Geneva, in 1882, had developed experimental myxœdema by total or partial thyreoidectomy; and in 1883 Theodor Kocher, of Berne, had reported that thirty out of one hundred thyreoidectomies had been followed by *cachexia strumipriva*.

Schiff in 1884 excised the thyreoid glands of sixty dogs with fatal results. He had pointed out that the animals could have been saved by a previous graft of part of the gland. This fact had led Murray, in 1891, and Howitz, in 1892, to the treatment of myxœdema with thyreoid extract with very successful results. Horsley's observations on monkeys and the collective investigations of Sir Felix Simon had shown that cretinism, myxœdema and *cachexia thyreostrumipriva* were one and the same. The part played by internal secretion had been first pointed out by Schiff. The isolation of iodothyrin by Baumann in 1896 had indicated its relation to iodine metabolism. Erwin Payr, in 1906, had transplanted a piece of thyreoid from a woman to the spleen of her myxœdematous daughter, with resulting improvement in the myxœdematous condition.

Dr. Gabriel added that thyroxin, isolated by E. C. Kendall in 1914, was a stirring activator of metabolism and probably the hormone of the thyreoid gland. It was formulated as $C_{11}H_{10}O_3NI_3$ by Kendall and Osterberg in 1919.

DR. DOUGLAS GALBRAITH mentioned the necessity for conservatism in the treatment of cretinism, and pointed out that it was disastrous to increase the dosage of thyreoid preparations too rapidly.

DR. H. DOUGLAS STEPHENS recalled the grafting of thyreoid glands into infantile cretins by Sir Thomas Dunhill at Melbourne many years earlier. Two patients were treated in that manner. Fine slices of thyreoid gland were used, but the method was unsuccessful. Dr. Stephens was rather surprised at the small size of the dose of thyreoid gland Dr. Grieve was using for the patient he had shown that night. He himself had been accustomed to using larger dosage and would not hesitate to increase the amount fairly rapidly.

DR. H. BOYD GRAHAM referred to the necessity for accuracy in the amount of thyreoid gland to be used. It was prescribed somewhat loosely by some physicians, who did not indicate whether the amount specific was the weight of fresh gland substance or of dried gland. He had formed the habit of stating on the prescription the weight of dried gland, and also of ensuring that the preparation was that of a manufacturing firm of proved reliability. When those precautions were taken the dosage could be increased steadily under supervision. Night restlessness, excitability and looseness of the stools were the usual warning indications of overdosage; but Dr. Graham had had the experience of observing softening of the bones, leading to deformity, and mentioned it as a warning to others.

Myasthenia Gravis.

DR. A. P. DERHAM and DR. GRAEME ROBERTSON showed a girl, aged twelve years and seven months, suffering from *myasthenia gravis*. Dr. Derham stated that two years earlier the child had suffered from diplopia, and one week later her left upper eyelid had drooped. About two months afterwards the right upper lid drooped also, and an oculist had observed weakness of the left lateral rectus muscle. After a period of six months the movements of the right eyeball began to weaken. About eighteen months before the time of the meeting a slightly nasal intonation of the voice had developed. A year later the nose began to swell; and for the past three months the patient had had a slight limp of the right leg and had lost some power in both legs. She had experienced a feeling of heaviness, but on no occasion had she vomited.

Dr. Derham mentioned several significant points. The patient's eyes were more widely and more easily opened in the morning than later in the day. Her voice tired towards the end of the day. Her legs became weaker after she had been using them for some time. The diplopia had been intermittent at the commencement of the illness, and she had experienced no difficulty in swallowing.

Dr. Robertson described the examination of the nervous system and commented on the findings. There was no anosmia, and visual acuity was good and equal in both eyes. The visual fields were full and the fundi were normal. Both pupils were large, the right being larger than the left. The right pupil reacted hardly at all to

light, direct and consensual. The left pupil reacted through a greater range to direct and consensual light. Both pupils reacted rather more fully to accommodation, and there was constant hippus. With reference to the ocular movements, Dr. Robertson said that abduction of both eyes was present, but was very weak and limited in range, especially on the left side. Elevation was just present. The other movements were absent, and there was no convergence on accommodation. He had noted apparent proptosis, which was more definite on the right side than on the left, and bilateral ptosis, which was more definite on the left than on the right. The patient constantly endeavoured to elevate the lids by contraction of the frontalis muscle. The elevation was variable and intermittent. The corneal reflex was sluggish. Corneal sensation was normal, and the sensory and motor functions of the fifth cranial nerve were not affected. The closure of both eyelids was very weak and movements of the mouth were slightly weak. When the patient smiled, the smile was transverse and rather like a snarl, by virtue of elevation of the medial part of the upper lip, especially on the left side. The movements of the forehead were fairly satisfactory. The child's hearing was good and equal on both sides. The palatal and pharyngeal movements were symmetrical, but the reflexes were rather poor. The tongue movements were unaffected.

Dr. Robertson said that in the examination of the motor system he had detected bilateral foot-drop, dorsiflexion of the right foot being weaker than that of the left one. The patient's response to the finger-nose test was a little unsteady, but there was no definite ataxia. The tone of the muscles appeared to be normal, and there was no wasting or fibrillation. The deep reflexes were quite active and the knee jerk was very active. The superficial abdominal reflexes were equal and active. On the left side the plantar response was definitely flexor, and on the right side was probably flexor. He had not detected any defect of sensation.

Dr. Robertson summarized the positive findings as bilateral ptosis and a little proptosis, involvement of the ninth and tenth but not the fifth cranial nerve, partial involvement of the seventh nerve, bilateral foot-drop and fatigability. The ocular muscles were involved rather than the nuclei. There was external but not internal ophthalmoplegia. Exophthalmos was an unusual feature of *myasthenia gravis*. He said that after the child had been given 0·5 milligramme of prostigmin the eyelids had closed more firmly, but on the injection of 1·0 milligramme very little effect had been evident. When 2·5 milligrammes of prostigmin and 0·0004 gramme ($^1/_{150}$ grain) of atropine sulphate had been injected she had been able to screw the eyes up remarkably well, but the ocular movements had not been improved. Under the influence of those injections she had been capable of powerful dorsiflexion of the feet, the facial expression had changed and she had been able to smile naturally. Dr. Robertson commented on the failure of the oculomotor mechanism to participate in the benefit. He thought this might be due to long-standing irreversible changes in the muscles. It was questionable whether it would be worth while to continue indefinitely with prostigmin therapy; 2·5 milligrammes given by injection were equivalent approximately to 30 milligrammes given by mouth.

Dr. Derham thanked Dr. Robertson for his assistance with the case, and remarked that the subjects of *myasthenia gravis* sometimes experienced difficulty in swallowing and in breathing, and were prone to have increased discomfort if they were exposed to cold. He invited Dr. Ferris to give an account of the medical history of myasthenia.

DR. ALAN FERRIS said that Willis, in 1685, in a book entitled "London Practice of Physic", had described asthenic bulbar palsy, which was later known as myasthenia. It was of interest to note that in the same book he had also described enteric fever. Willis was a professor of anatomy at the University of Oxford, and had in 1664 published a book entitled "*Cerebri Anatome*". In it there was a careful description of the circulation, part of which was still known as the circle of Willis. In 1877 Sir Samuel Wilks had described, in *Guy's Hospital Reports*, a case of myasthenia. A girl, aged about twenty-five years, suffered from general weakness, strabismus and slow speech. She could walk, but all movements were slowly performed. It was thought likely that she was hysterical; but a month later bulbar palsy, dysarthria, dysphagia and loss of the cough reflex had developed. Soon afterwards respiratory paralysis set in and death ensued rapidly. An autopsy was made, but no macroscopic lesions were disclosed.

Dr. Ferris went on to say that Erb, who was famous for his work on brachial palsy, electrical reactions in muscles and muscular dystrophies, had presented three patients with myasthenia at a meeting in 1878. In all of them ptosis was the prominent early symptom. He had also demonstrated with the faradic current the myasthenic reaction of exhaustion. In 1887 Oppenheim had demonstrated the lack of histological changes in the nervous system in myasthenia. Goldflam had also paid special attention to the condition, which had been known as the Erb-Goldflam or the Erb-Oppenheim symptom complex. It was Jolly who, in 1891, had placed the disease on a clinical footing for the first time. He had demonstrated particularly the tendency of the muscles in myasthenia to tire with voluntary effort, and the condition became known as *myasthenia gravis pseudoparalytica*. Farquhar Buzzard, in 1900, made an exhaustive study of the disease and paid special attention to the changes that occurred outside the nervous system. In the same year Bramwell and Campbell published an exhaustive report on all the papers that had been published up to that time. Sixty cases were reviewed. Bramwell and Campbell showed from them that ptosis and diplopia were among the earlier symptoms. The youngest patient was twelve years of age and the average age was thirty years.

With reference to the history of treatment, Dr. Ferris said that Erb and Goldflam had advocated mercury and iodine, and Strumpell had used strychnine. Others had used various endocrine derivatives. In 1930 Dr. Harriet Edgeworth, who herself suffered from the disorder, had introduced the use of ephedrine by mouth; and at about the same time Remen had recommended glycine. Glycine did not seem to have very much effect alone; but when Boothby combined glycine and ephedrine the first effective treatment was established. In 1934 a medical woman named Walker had tried physostigmin, with rapid and dramatic effects. The analogy with curare poisoning was probably the reason for the selection of physostigmin. The side effects on the heart and intestines led to the combination of prostigmin with atropine. That treatment had its maximum effect in approximately forty-five minutes, and the effect lasted for between six and eight hours. Everto, in 1935, had advocated the use of prostigmin orally, in much larger dosage. He used about 25 milligrammes by mouth, in comparison with 0·5 milligramme given by hypodermic injection. Oral administration produced a slower but more lasting effect. Dr. Ferris added that Everto had attempted to synthesize prostigmin. "Substance 36" was effective, but not to the same extent as prostigmin.

Dwarfism.

DR. M. O. KENT HUGHES showed an undersized boy, aged twelve years, with the object of promoting a discussion on the subject of dwarfism. He said that the boy's height was equivalent to that of a boy more than three years younger; he was the shortest boy of his age in a large school. He was similarly below the height standard for his family. His father was 180 centimetres (six feet) in height and his mother 175 centimetres (five feet ten inches). A brother three and a half years younger was 145 centimetres (four feet ten inches) in height, and the patient's height was only 124·4 centimetres (four feet one and three-quarter inches). The weight of the patient at birth was 4·5 kilograms (ten pounds) and at six months of age he weighed 7·7 kilograms (seventeen pounds) and was 63·8 centimetres (twenty-five and a half inches) in length. At the age of nine and a half years his height was 116·3 centimetres (three feet ten and a half inches); in the following year it had increased by 4·4 centimetres (one and three-quarter inches) and in the two successive

years by 2·5 centimetres (one inch) and 1·25 centimetres (half an inch) respectively. There was a retardation of only two years in the dental age of the patient, and he was of normal osseous age.

Dr. Kent Hughes said that Gardiner-Hill, in the Oliver-Sharpey Lectures, published in *The British Medical Journal* in June, 1937, had discussed differential growth. He had stated that before the sixth or seventh year of life the measurement from the symphysis to the vertex would be found to be greater than the measurement from the symphysis to the soles, but that after the age mentioned the lower measurement exceeded the upper one in normal individuals. In the case of Dr. Kent Hughes's patient the upper measurement was 62·5 centimetres (twenty-five inches) and the lower 60·3 centimetres (twenty-four and a half inches).

Dr. Kent Hughes invited attention to Gardiner-Hill's classification into simple dwarfism of four types and dwarfism and infantilism of three main types. He considered that the boy he had shown that night was probably hypopituitary with regard to growth and sex development, and that he would need help at puberty. For three years there had been on the market a preparation known as "Antuitrin *G*", which was stated to be of value in the treatment of hypopituitary dwarfism. He had seen a number of reports in the literature of the results of treatment, which indicated that the response to treatment was not uniform. The treatment was expensive and would not be justified unless there was a reasonable hope of success. The boy had been given that form of treatment for two months, but had increased only 0·6 centimetre (one-quarter of an inch) in height.

In reply to a question from Dr. Macdonald, Dr. Kent Hughes said that he would define a dwarf as a person definitely below normal stature.

DR. R. R. WETTENHALL remarked that the boy shown could not be exhibited as a dwarf, as he would not create interest because of his symmetrical appearance.

DR. WILFRED KENT HUGHES said that he knew a woman who had several small children. Five of them were dwarfs, but one was a huge girl, 180 centimetres (six feet) in height at the age of sixteen years. The undersized ones had not shown any appreciable incapacity.

DR. DOUGLAS GALBRAITH mentioned that Tom Thumb had married a dwarf, but that they had had a child of normal size.

DR. COLIN ROSS said that "Pituitrin *G*" suited dwarfs of the Tom Thumb type. He knew of one who had gained 5·0 centimetres (two inches) in three months, and another who had grown 12·5 centimetres (five inches) in eight months.

The Royal Australasian College of Physicians.

INAUGURAL MEETING.

THE inaugural meeting of the Royal Australasian College of Physicians, and other functions connected with it, will be held in Sydney during the week beginning December 12, 1938. It is expected that most of the visitors from the other Australian States and from New Zealand will arrive on Monday, December 12, or Tuesday, December 13.

It was confidently hoped by the council of the college that the new offices at 145, Macquarie Street, would be open early in the month of December; but so many delays have occurred which have been beyond the control of the council that it is now unlikely that the remodelling of the college's building will be sufficiently advanced to make occupation possible by the date of the inauguration. The building, formerly the premises of the Warrigal Club, is a dignified example of early colonial architecture, and will be particularly well suited to serve as the home of the Royal Australasian College of Physicians.

The ground floor will contain administrative offices and a lounge where members may meet. The rooms are lofty, large and comfortable, as are also those on the first floor, which will be used as a library and a meeting place for the council and smaller committees. The upper floors of the building will not be required in the near future for the purposes of the college and are therefore let as residential flats. There is thus room for expansion in years to come, while the present requirements are amply met.

At the rear of the building a hall is being constructed which will seat approximately 200 persons. This hall has been designed specially for the use of scientific bodies; but particular care has also been paid to comfort. A special design for ventilation has been approved, and seating is to be by individual chairs of the best modern theatre type, so arranged as to secure maximum visibility of the screen and platform. Elaborate arrangements have been planned for the projection of slides, pictures, X ray films, cinematograph films and microscopic specimens, in order that scientific communications may be presented under ideal conditions.

PROGRAMME.

All fellows and members attending the inauguration are requested to register soon after their arrival. On or before Monday, December 12, 1938, registration should be effected at the temporary office of the college, on the second floor of "Craignish", 185, Macquarie Street, Sydney. Those desirous of registering on Tuesday morning, December 13, should do so at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, where all facilities will be available.

Entrée cards for the inaugural ceremony, reception and other functions and entertainments will be supplied to fellows and members immediately upon registration. They are asked to assume that they are invited to all functions and merely to indicate to the honorary secretary as soon as possible whether they intend to be present. This arrangement will materially facilitate the organization of the functions and will at the same time obviate the necessity of an acceptance for each individual function. Invitations to the garden party, however, will be sent by His Excellency the Governor of New South Wales and Lady Wakehurst, and not by the college, and will, of course, demand a reply.

Having in view the possibility that fellows and members may desire the presence of friends (other than the ladies accompanying them) at the inaugural ceremony and the reception, the council requests them to submit nominations to the honorary secretary, indicating the order of preference of the persons nominated. Every effort will then be made to issue invitations to the nominated persons, subject to the necessary limitation of accommodation. It is essential, however, that the list of persons nominated be forwarded by fellows and members not later than November 20, 1938.

The programme drawn up for this the first meeting of the college is as follows:

Tuesday, December 13, 1938.

11 a.m.: Council Meeting.

A council meeting will be held at the William H. Crago Council Room at British Medical Association House, 135, Macquarie Street, Sydney. At this meeting the newly accepted members of the college who satisfied the censors at the recent examinations held in Melbourne, Sydney and New Zealand, are expected to attend, if possible, in order that they may be formally admitted by the President to membership of the college.

2.15 p.m.: General Meeting and First Scientific Session.

The general meeting and first scientific session will be held at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney, and will terminate not later than 5.30 p.m.

Agenda of General Meeting: (i) Introductory, (ii) election of councillors, (iii) resolution concerning royal charter, (iv) statement concerning college building, (v) financial statement, (vi) other business.

First Scientific Session:

3.30 p.m.—Dr. Ian Wood: "Some Observations on the Massive Intravenous Injection of Physiological Fluids".

4 p.m.—Dr. J. C. Eccles: "The Physiology, Pharmacology and Pathology of Neuromuscular Transmission".

3 p.m.: Afternoon Tea Party for Ladies.

All ladies accompanying fellows and members are invited to attend an afternoon tea party, which will be held at Elizabeth Bay House, 1, Onslow Avenue, Elizabeth Bay.

8 p.m.: Official Dinner.

The official dinner, which is for fellows and members only, will be held in the Banquet Hall of the Hotel Australia, Castlereagh Street (between King Street and Martin Place). It is hoped that the Prime Minister, the Premier of New South Wales and Federal and State Ministers will be present. Full evening dress will be worn.

On this evening Mrs. S. A. Smith will entertain the wives of councillors at dinner.

Wednesday, December 14, 1938.

10 a.m.: Second Scientific Session.

The second scientific session will be held at the New Medical School, the University of Sydney.

10 a.m.—Dr. D. J. Thomas: "Some Röntgen and Kymographic Studies of Coronary Disease".

10.30 a.m.—Dr. Gilbert Phillips: "Pre-Motor and Pyramidal Tract Disturbances".

From approximately 11.30 a.m. facilities will be provided for the inspection of special demonstrations set up in the departments of medicine and surgery, illustrating respectively teaching methods in cardiac disease, especially the demonstration of cardiac sounds, and hydatid disease. Exhibits of apparatus used in special research in these departments, in particular that being used in the work now being done on nystagmus in the department of surgery, will be on view.

Afternoon.

No official functions or entertainments will be held in the afternoon. Arrangements are being made, however, for the private entertainment of parties.

8.15 p.m.: The Inaugural Ceremony.

The inaugural ceremony will take place in the Great Hall of the University of Sydney.

His Excellency the Governor of New South Wales, Lord Wakehurst, and Lady Wakehurst will be present, together with representatives of the Federal and State Governments.

The President, Sir Charles Blackburn, will outline the history of the formation of the college and will request His Excellency the Governor of New South Wales to declare the college formally inaugurated. After representatives of the Federal and State Governments have spoken, the recently accepted members will be formally presented. Dr. Morley Fletcher, who is visiting Australia as the representative of the Royal College of Physicians of London, will deliver a public address. Dr. Fletcher will at the conclusion of his address present to the Royal Australasian College of Physicians a caduceus, the gift of the Royal College of Physicians of London. The President of the college, after acknowledging this gift, will admit Dr. Fletcher as an honorary fellow of the college.

Academic dress will be worn at the inaugural ceremony. Fellows and members may wear either the special robes of the college or those proper to their university degrees or diplomas of other colleges.

Thursday, December 15, 1938.

10 a.m.: Third Scientific Session.

Fellows and members will meet for the third scientific session at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney.

10 a.m.—Dr. Cotter Harvey: "The Simulation of Pulmonary Hydatid Disease: A Clinico-Radiological Demonstration".

10.20 a.m.—Dr. Douglas Anderson: "Studies in the Incidence of Tuberculous Infection in Sydney".

10.40 a.m.—Tea.

11 a.m.—Dr. Frank Niall: "Exophthalmos".

11.30 a.m.—Dr. John Halliday: "Myelomatosis of Bone".

5 p.m.: Late Afternoon Party.

The council is organizing a late afternoon party on this day. Details will be published at a later date.

8.30 p.m.: Reception.

A reception by the President will be held at the ballroom of Messrs. David Jones, Limited, Elizabeth Street (between King Street and Market Street). The President is inviting to this function a large number of distinguished citizens and visitors and all fellows and members of the college and their wives.

Fellows and members are requested to wear the college robes or alternatively academic dress. Supper will be served from 9.45 p.m. onwards.

Friday, December 16, 1938.

No functions will be organized by the college for this day.

3 p.m.: Vice-Regal Garden Party.

Their Excellencies the Governor of New South Wales, Lord Wakehurst, and Lady Wakehurst have graciously offered to entertain the fellows and members of the college and their wives at a garden party at Government House on this afternoon. (Dress: lounge suit.)

Saturday, December 17, 1938.

10.30 a.m.: Special General Meeting.

The special general meeting will be held at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street. Its purpose is the consideration by fellows and members of certain proposed alterations in the constitution.

Correspondence.

NASAL SINUSITIS IN CHILDREN.

SIR: Over thirty years ago I gave up lavage except in cases of sinusitis. I became an ardent advocate for radical operation up to 1919, when I instituted treatment by diathermy. This, with an occasional endonasal antrostomy, has been my routine method ever since. Endonasal antrostomy is useless in children and young adults unless carried out by electrocoagulation.

Yours, etc.,

22, Collins Street, Melbourne, October 28, 1938. W. KENT HUGHES.

FINAL REPORT OF THE COMMONWEALTH ADVISORY COUNCIL ON NUTRITION.

SIR: Our Australian myall blacks will flash their natural dentures in derision when they see the "final report" of the Commonwealth Advisory Council on Nutrition, and in fact the "final reports" of other experts on this controversial subject.

Since the introduction by their white brothers of buffalo and other cows, nannies and she-asses, binghi has utilized this source of liquid nourishment as a luxury and not a necessity.

I will admit having seen piccaninnies up to the age of six years drinking mother's milk with maternal encouragement; but beyond that age consumption of milk among the bush myalls must be "woefully deficient".

Among other things our aboriginal experts on nutrition advise:

(i) When selecting meat and fish see that they are well nourished and fat.
(ii) Don't reject an animal's internal organs, including, of course, the alimentary tract.
(iii) Never boil meat or fish, but always grill lightly over the flames or lightly roast in an ant-bed oven.
(iv) Eggs from duck, geese, turkeys, crocodiles, turtles and goannas are not to be despised.
(v) In selecting eggs, those with chickens inside are to be preferred.
(vi) Eat when in season yams, berries, wild fruit and nuts, mulga seeds, water-lily roots and cabbage palms.
(vii) Having robbed a wild bees' hive, eat not only the honey, but the comb and any bees that may rest therein.
(viii) Finally our myalls advise: eat what and when Nature provides.

Yours, etc.,

DAVID R. BROWN.

Dora Creek,
New South Wales,
October 29, 1938.

THE HERMAN LAWRENCE MEMORIAL PRIZE.

SIR: The Victorian branch of the British Association of Dermatology and Syphilology has arranged for the University of Melbourne to accept an annual prize in dermatology. The prize will be known as "The Herman Lawrence Memorial Prize" and will be open for competition by examination, by medical students of the University of Melbourne. The late Dr. Herman Lawrence was one of the pioneers of dermatology and dermatological teaching in Australia. Should any members of the British Medical Association care to contribute to the capital sum required to finance the annual prize, their subscriptions would be gratefully received by the undersigned on behalf of the association.

Yours, etc.,

ROBERT C. E. BRODIE,
Honorary Secretary, Victorian Branch, British Association of Dermatology and Syphilology.

63, Collins Street,
Melbourne,
October 19, 1938.

A CONSIDERATION OF GENERAL ANÆSTHESIA FOR DENTAL SURGERY.

SIR: The discussion on general anæsthesia for dental surgery brings up the differences of opinion held upon the scope respectively of insufflation and inhalation intratracheal anæsthesia. Alas, too frequently methods used in medicine are based too much on fashion and too little on common sense! Small-bore insufflation anæsthesia has had a long and useful run of being fashionable and is now running a risk of being shelved for large-bore inhalation anæsthesia.

In 1926, under the heading of "The Principle of Intratracheal Anæsthesia", in this journal, I emphasized that in small-tube insufflation anæsthesia a negative pressure must not be allowed to occur in the trachea during inspiration. If this detail is attended to, blood or other foreign bodies cannot be inspired. I described a tambour which, if connected to the vapour supply to the patient, would register such a negative pressure, if present, and this could be eliminated by adjustment of the volume or pressure supply. Such an instrument is useful until the anæsthetist has accustomed himself to the machine and pump he uses, after which he can manage without it in safety.

Large-bore inhalation anæsthesia became a necessity when gas and oxygen intratracheal anæsthesia came into use, for without it, in conjunction either with packing or with an inflatable collar, leakage was so great that efficiency and economy suffered.

The large-bore tube is, of course, the airway for both inspiration and expiration, and while it is in use there is no way in which pulmonary or bronchial secretions may escape; on the other hand, the small tube is used for the intake of air only, and secretions in the trachea tend to be blown up into the pharynx.

When, therefore, ether and air is the anæsthetic, the use of the inhalation large-bore method is contraindicated, especially in long anæsthetics. This is where the now unfashionable small-tube insufflation anæsthesia is strongly indicated in preference to the other.

When gas and oxygen are given the large-tube method is the only one available, and the amount of secretion even in long operations is small. Where ether is given as an adjuvant to gas and oxygen the amount is usually very small and does not seem to stimulate much secretion.

Staunch supporters of the big-tube method will, I know, direct my attention to numbers of papers demonstrating that blood will get into the trachea during anæsthesia by the small-tube method. My reply is that if this happens during operation it is the anæsthetist's lack of care or understanding which allowed it to happen. Usually, however, it happens after the operation. Personally, I cannot understand the carelessness with which anæsthetists and surgeons, who have cooperated in keeping blood, pus and mucus out of the trachea during the operation, will light-heartedly allow the same patient to be removed from the theatre still too deeply under the anæsthetic to protect himself from inspiration by coughing or swallowing. Of course, blood will get into the trachea in such circumstances after mouth, nose or throat operations.

I admit that with the large-tube method there is hardly time for sufficient secretions to collect during a dental anæsthetic to be much of a menace, but it was Dr. Renton's expression of view that large-bore anæsthesia was so safe, whilst the small-tube method was only relatively so, and my knowledge that quite a number of practitioners believe the same, which has prompted these lines.

Yours, etc.,

A. B. K. WATKINS,
M.S. (London), F.R.C.S. (England).

Commercial Bank Chambers,
Bolton Street,
Newcastle,
New South Wales.
November 3, 1938.

Notice.

ROYAL COMMISSION ON NATIONAL HEALTH INSURANCE.

THE following counsel have been briefed by the British Medical Association in Australia to continue the presentation of the case for the profession before the Royal Commission: Mr. C. A. Weston, K.C. (senior), and Mr. W. J. V. Windeyer (junior), assisted by Mr. J. D. Evans.

The Commission will sit at Hobart on Monday, November 14.

Books Received.

MENINGIOMAS: THEIR CLASSIFICATION, REGIONAL BEHAVIOUR, LIFE HISTORY AND SURGICAL END RESULTS, by H. Cushing, M.D., with the collaboration of L. Eisenhardt, M.D.; 1938. Baltimore: C. C. Thomas. Crown 4to, pp. 799, with numerous illustrations. Price: $15.00 net.

CLINICAL PÆDIATRICS (THE BABY), edited by W. R. F. Collis, M.A., M.D., F.R.C.P., F.R.C.P.I., D.P.H., with a foreword by A. H. Davidson, M.D., F.R.C.P.I., F.C.O.G.; 1938. London: William Heinemann (Medical Books) Limited. Demy 8vo, pp. 471, with illustrations. Price: 21s. net.

Diary for the Month.

Nov. 15.—New South Wales Branch, B.M.A.: Ethics Committee.
Nov. 16.—Western Australian Branch, B.M.A.: Branch.
Nov. 17.—New South Wales Branch, B.M.A.: Clinical Meeting.
Nov. 22.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Nov. 23.—Victorian Branch, B.M.A.: Council.
Nov. 24.—New South Wales Branch, B.M.A.: Branch.
Nov. 24.—South Australian Branch, B.M.A.: Branch.
Nov. 25.—Queensland Branch, B.M.A.: Council.
Dec. 1.—Western Australian Branch, B.M.A.: Council.
Dec. 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.
Dec. 6.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Dec. 7.—Victorian Branch, B.M.A.: Annual Meeting.
Dec. 7.—South Australian Branch, B.M.A.: Council.
Dec. 8.—New South Wales Branch, B.M.A.: Branch.
Dec. 9.—Queensland Branch, B.M.A.: Annual Meeting.
Dec. 13.—New South Wales Branch, B.M.A.: Ethics Committee.
Dec. 14.—Victorian Branch, B.M.A.: Council.
Dec. 16.—Queensland Branch, B.M.A.: Council.
Dec. 20.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments.

Dr. B. A. Stephen has been appointed Government Medical Officer at Kiama, New South Wales.

* * *

Dr. P. J. Benjamin has been appointed Honorary Medical Officer to the Barmera Hospital, South Australia.

* * *

Dr. J. B. Mathieson has been appointed a Quarantine Officer, pursuant to the provisions of the *Quarantine Act*, 1908-1924.

* * *

Dr. A. E. Newton-Tabrett has been appointed a Medical Officer in the Medical Branch of the Department of Public Instruction of New South Wales.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xviii to xx.

ALFRED HOSPITAL, MELBOURNE, VICTORIA: The Marion and E. H. Flack Travelling Scholarship.
AUSTIN HOSPITAL FOR CANCER AND CHRONIC DISEASES, HEIDELBERG, VICTORIA: Resident Medical Superintendent.
CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.
FREMANTLE HOSPITAL, FREMANTLE, WESTERN AUSTRALIA: Junior Resident Medical Officer.
MANLY DISTRICT HOSPITAL, MANLY, NEW SOUTH WALES: Honorary Physician to Anti-Tuberculosis Clinic.
ROCKHAMPTON HOSPITALS BOARD, ROCKHAMPTON, QUEENSLAND: Resident Medical Officer.
ROYAL HOBART HOSPITAL, HOBART, TASMANIA: Resident Medical Officer.
ST. GEORGE DISTRICT HOSPITAL, KOGARAH, NEW SOUTH WALES: Resident Medical Officers.
THE LORD HOWE ISLAND BOARD OF CONTROL: Medical Officer.
THE VICTORIAN EYE AND EAR HOSPITAL, MELBOURNE, VICTORIA: Assistant Honorary Aural Surgeon, Resident Surgeons.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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